IRON AGE

THE NATIONAL METALWORKING WEEKLY A Chilton Publication SEPTEMBER 21, 1961

Management's Plans for

CAPITAL SPENDING

A Special Report on

Metalworking Capital Appropriations

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Predict Sheet Metal Formability p. 93

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controlled microstructure eliminates extra finishing

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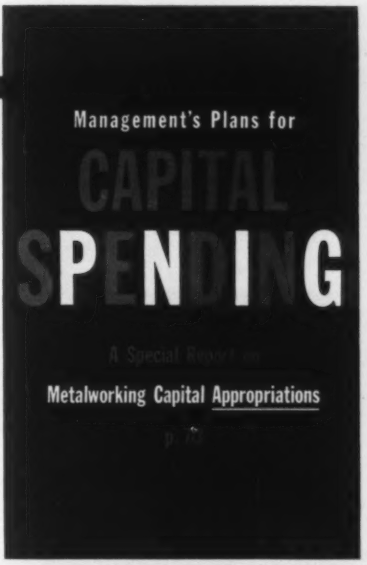


Management's Plans for

CAPITAL SPENDING

A Special Report on

Metalworking Capital Appropriations

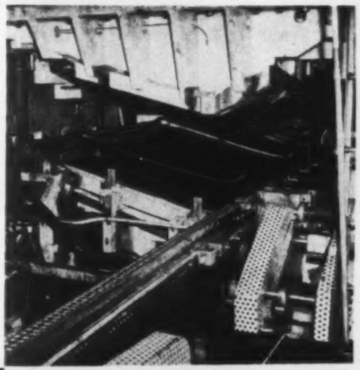
p. 73

Expansion Programs Shape Up Slowly

Caution still governs metalworking management's expansion projects. But there are signs that the tempo of capital goods spending is stepping up. Top management reports from 38 metalworking industries give the future capital spending outlook in this latest survey of metalworking capital appropriations. p. 73

Steel Labor: Battle Lines Form

Auto contract terms plus President Kennedy's attempts to hold steel prices complicate the steel labor situation. Editor-in-Chief Tom Campbell discusses latest ramifications. He also predicts the course of next year's steel negotiations. p. 63



Take the Guesswork Out of Forming

The forming of sheet-metal shapes is often a hit-or-miss affair. Why waste time on costly trial attempts in setting up a work-run? A new analytical approach dissects twelve forming processes to show how a job can be done right—the first time. p. 93

Next Week

What's Next in Auto Trends?

The new 1962 cars are out. But what do they show about future auto trends in styling, materials, engineering? Next week's Special Report looks into these new developments. Of special interest: An exclusive interview with Pontiac general manager S. E. Knudsen.

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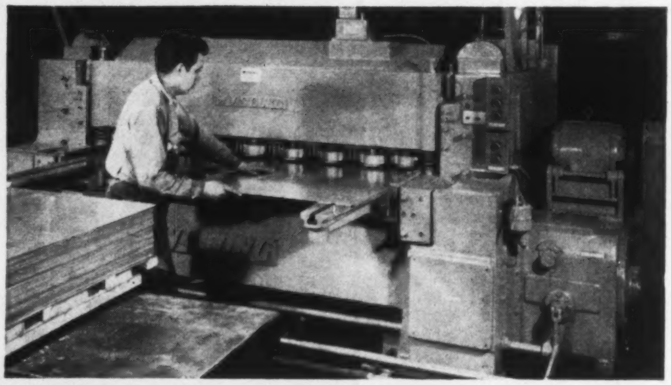

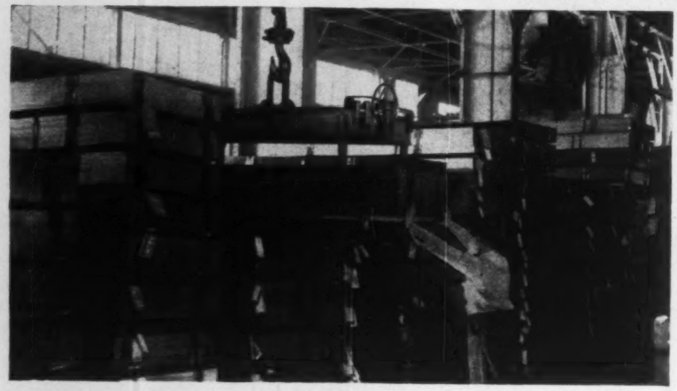

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EDITORIAL

The Unsent Letter: By a Composite Ghost

The admonition from the President to steel leaders not to raise prices ruffled a lot of feathers—privately. But our Mr. Not-So-Big Steel might answer Mr. Kennedy thusly:

My Dear Mr. President:

I am not one of the Big 12 to whom you sent your letter. But I have seen your missive.

Let's leave out any chewing match over statistics. Mr. President, the steel industry cannot be run by statistical averages.

When your Mr. Heller was running around the campus back in the 1930's, we and other steel companies had a great time cutting each other's throat. We got steel prices so low there wasn't enough left over to pay for milk for the cat.

Soon business picked up a little and prices stiffened some. Before we got into the war, Mr. Leon Henderson in 1940 called several steel bigwigs. He said the President did not want to see the price go up. That settled that one.

When we got into the war, controls took over. Our prices were frozen at a point not too far from the lowest on record.

Well sir, we did get some relief in 1946. But as any statistician will tell you, the lower the base you start with, the greater the increase. Since steel prices were about as low as possible in the 1940's, we can't get excited because Mr. Heller says prices are up so-and-so between 1947-1958.

We would not have been able to buy new equipment, employ people, spend for research, and pay high wages and taxes if there had not been some catching up.

But now, Mr. President, we are not in the deluxe class in steel. We are a small outfit which gets the gimlet eye from the bankers. Mr. McDonald hits us with the same sized bricks he uses on the big ones. And our machinery, sales, product mix, and working capital aren't anything to write home about.

So, Mr. President, if the big ones can't get a little more for their kitty to stay strong, where do we get off? It won't do any good later to harass the big ones because they low-priced us out of the market. We won't be there. And a little later, maybe they won't be there either.

Sincerely yours,
(s) Not-So-Big Steel

Maybe Mr. Not-So-Big would not write that way, but he sure as the devil thinks that way.

Tom Campbell
Editor-in-Chief

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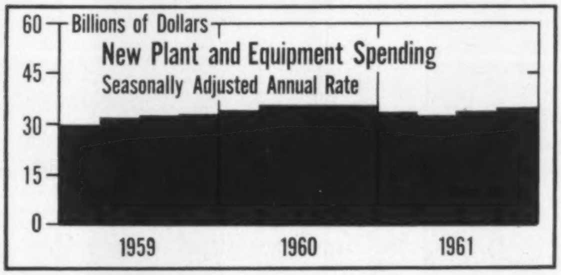
Capital Spending Edges Upward

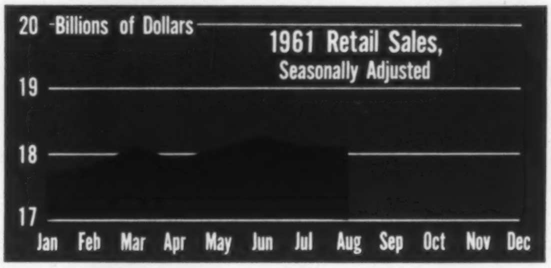
It isn't an easy upgrade, but capital spending is moving up slowly. The Securities and Exchange Commission's quarterly survey of capital spending intent shows a slight upward movement through both the third and fourth quarter. The seasonally adjusted annual rate is moving up in these steps: Second quarter, $33.5 billion; third quarter, $34.8 billion; fourth quarter, $35.9 billion. This slow rise is backed up by The IRON AGE's quarterly survey of capital appropriations (see p. 73), also indicating a slow upturn.



According to SEC returns, manufacturing companies will spend about 5 pct less in 1961 than in 1960; nondurables are up 3 pct, durables down a full 13 pct.

Retail Sales Won't Budge

In the face of uptrends in most business indicators, retail sales stayed stubbornly at $18.1 billion in August. Durables declined less than 1 pct while nondurables rose about the same amount. Best guess is that consumers in midsummer still felt some uncertainty as a hangover of the past recession. When this wears off, retail sales should climb.



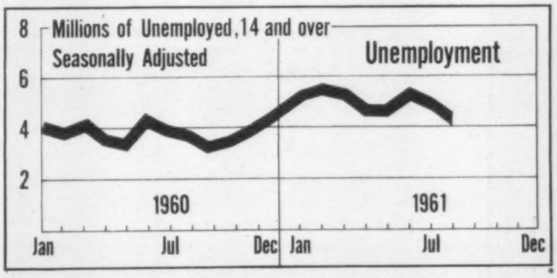
Profits Look Better—Now

Second quarter earnings of manufacturing companies show some life and a stronger pulse for 1961. Profits for all manufacturing reached $3.9 billion in the second quarter. This almost reaches the $4.08 level of the second quarter of a year ago and is well above the first quarter's $2.9 billion.

With durable goods makers paralleling the increase, the outlook for the third and fourth quarters now begins to look better for metalworking. Profits for all manufacturing reached 4.4 pct of sales (after taxes.) This is nothing to brag about, compared, say, with the same period of 1959—(5.5 pct.) But it's a respectable figure for the tailend of a recession.

Employment Outlook Improves

A midsummer drop in unemployment brought the jobless total down to 4.5 million. Although the jobless rate clings roughly to 6.1 pct of the workforce, the outlook is for better things. For one thing, the automotive model changeovers at mid-August made the unemployment rate look worse than it is. Labor Dept. people, eyeing the general improvement of the economy, think the total will drop below 4 million this fall.



Is Housing Helped, or Hurt?

Last week a leading housing authority, National Gypsum's M. H. Baker, forecast a rate of new homestarts of 1.3 million a year through 1965. Among the factors, according to Mr. Baker, is greater availability of credit. But elsewhere, there are signs of not-so-easy credit, mostly as a result of the Administration's critical eye on anything that spells inflation.

Will Farmers Buy Next Year?

Despite negative reports on farm income, farm equipment makers are scheduling relatively strong building next manufacturing season. (The cycle in this seasonal industry starts in December.) Income this year is shaping up better than indicated earlier and forecasts for 1962 are encouraging. Another factor: Implement makers are now getting out of strictly farm markets for a more even manufacturing cycle. Two negative thoughts: Labor trouble is a possibility; hurricane effects have to be assessed.

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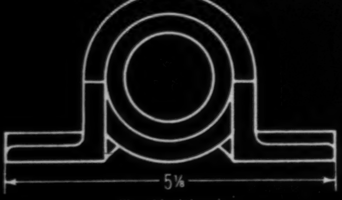
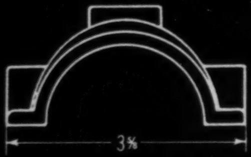
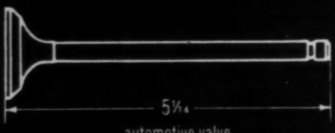
disc grinds parts like these



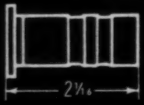
pillow block bearing



connecting rod cap



automotive valve



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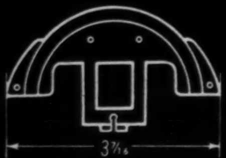
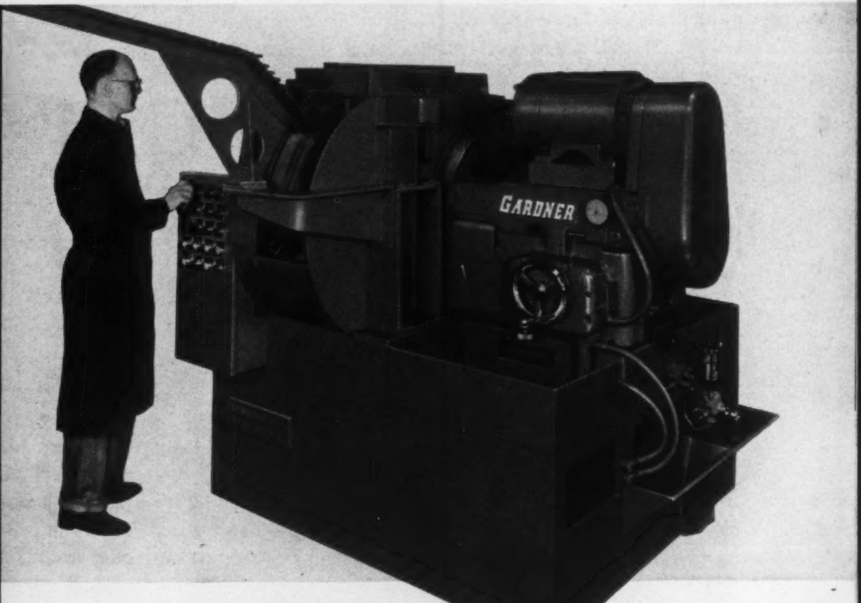


typewriter part



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UAW: Slow at GM; No Go at Others

In contrast to the sudden, swift settlement on economic matters, General Motors Corp. and the United Auto Workers bogged down over local issues. Like a battle being fought from house to house, talks since then have moved issue by issue, plant by plant.

Negotiations at Ford Motor Co. and Chrysler Corp. came to a virtual standstill. Union negotiators were not even willing to hold serious talks aimed at getting local issues out of the way. Meanwhile, Ford and Chrysler workers stayed on the job. But the companies expect the same trouble as GM is having when talks resume again.

The slow pace brought new pressures from the government, urging a speedup in the settlement rate. And the International Union told the locals to settle and get back to work.

But it isn't often that local leaders have such an opportunity to act hard-nosed toward GM—and they were making the most of it. In turn, GM was just as determined to convince the union that "There are no more goodies in the bag."

By Monday morning, after meeting all through the weekend, only 77 locals had settled.

No cars were being produced. The long shutdown of a key Fisher Body stamping plant in Pittsburgh had resulted in a shortage of parts. And Louis G. Seaton, GM vice president in charge of personnel, was moved to remark "we cannot build half an automobile."

The union called a meeting of the GM Council for 2 p.m. Wednesday. It could order the workers back to their jobs. Even so, production couldn't get underway much before next Monday. Meanwhile, GM was losing 13,000 cars a day.

USWA: Lone Star Sues For $5.5 Million

Lone Star Steel Co. filed a $5.5 million damage suit against the Steelworkers Union last week. The company seeks to recover losses alleged to have resulted from an "illegal strike" in 1957.

In 1957, the Texas steelmaker was struck. About 770 workers continued to work, about 2600 stayed out. During the strike, the plant area was the scene of violence. And, the company charges, it was unable to ship its products and production costs "increased tremendously."

NLRB: Clampdown On Unfair Employers

National Labor Relations Board plans to clamp down on unfair labor practices, particularly by employers.

NLRB chairman Frank W. McCulloch says the government should get tougher with union-busting employers. He claims NLRB does not now have strong enough powers.

AFL-CIO: A Trucking Union

First push may be underway within the AFL-CIO to launch a rival transportation union. The executive board of the Communications Workers of America has urged such a move in a resolution sent to the AFL-CIO.

When the International Brotherhood of Teamsters was expelled from the merged labor federation in 1957, some elements wanted to start a rival union. However, the idea has lacked support from craft union leaders, some want the Teamsters returned to the fold. But industrial union leaders have never given up on it.

The timing of the CWA resolution could be important. It could pick up needed support from other unions before the December convention of the AFL-CIO.

The Teamsters Union is finding itself fighting a series of brush fires in its backyard: The remainder of Chicago's cab drivers have bolted; a rebel movement may be underway in Pittsburgh; Philadelphia's giant local 107 (13,000 members) has a strong opposition group seeking to oust the leadership; and the union had a tough time getting Western Conference drivers to accept the contract worked out by the union.

In addition, the Teamsters have announced plans to go after any and all unorganized workers—regardless of jurisdictional rights claimed by other unions. The Teamsters have already moved into metalworking, and they have figured in a representation battle with the International Assn. of Machinists.

The industrial unions may be able to convince the craft unions that the time is ripe to pick up dissatisfied Teamsters and other truckers, now unorganized, who want a union but not the Teamsters.

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By R. W. Crosby

★ Metal Mining Aid Shapes Up

Stirrings in Congress over depressed metal mining industries may lead to a program of Federal aid for many domestic producers. Aid could go to the iron ore, lead, zinc, manganese and beryllium industries.

Two factors will determine whether legislation for government aid for these industries will get support:

1. The outcome of the present fight over lead and zinc subsidies.

2. The outcome of studies of the impact of imports on these minerals.

If the lead-zinc bill now before Congress becomes law this session (and there is still a slight chance), or even next session, Federal aid for other depressed mining areas will be pushed.

The impact of imports is being studied closely. Leading the fight in the House is Rep. John Dent (D., Pa.). He believes many problems in the industries are "connected directly to importation."

In the Senate, a powerful group of legislators wants to look at the effect of imports on mining. Led by Senate Republican Leader Everett M. Dirksen (Ill.) and Democratic Leader Mike Mansfield (Mont.), the group is calling for a U. S. Tariff Commission investigation of the impact of imports on lead, zinc, manganese, beryllium, and also fluorspar and cobalt.

Next year, legislation seeking Federal aid for other mining industries is promised. The bills probably will come even if the lead-zinc bid fails.

Rep. Odin Langen (R., Minn.), says iron ore producers will press for legislation in 1962. An iron ore aid program would be bigger than that sought for lead and zinc.

Rep. Thomas Morris (D., N. M.), may seek similar legislation for manganese. Since supports were dropped in 1959, manganese mines in operation have dropped from about 100 to four.

One problem for all these industries will be attempts to aid them through tariff restrictions on imports. Subsidies have more chance than tariff changes.

A tariff clause tacked on these bills (as has been done to the lead-zinc bill) alienates support from "Free Traders," a group which has President Kennedy's backing.

▪ New Buying Unit Opens Doors Oct. 1

A concerted drive to get the new Defense Supply Agency in operation will begin Oct. 1. Lt. Gen. Andrew T. McNamara will take over then as director of the huge buying agency.

Washington is expected to be the headquarters for the new agency. It will handle buying of common items such as industrial, automotive and construction supplies for all military services.

The agency is expected to be in full swing within 90 days after Gen. McNamara (no relation to the Defense Secretary), takes over. Involved in dealings with the new agency will be private contractors for some 1.2 million items bought by the military.

▪ More Funds Due For Small Business

The government is increasing its efforts to make more investment capital available to small businesses.

In latest actions, Congress beefed up the loan fund of the Small Business Administration (SBA) by $125 million, and the SBA revised its lending rules.

The extra funds were approved to permit SBA to keep up a vastly-expanded lending rate which has been underway since early this year. Loans are running at a rate double that of a year ago.

SBA modified its bank participation loan program to encourage private financing of these loans. The banks will now handle loan paperwork and issuance.

SBA will provide up to $350,000 for any one loan. The bank is required to put up at least 25 pct of the total loan—which can now go as high as $465,000.

▪ Contractors Rap Depressed Area Jobs

Gripes are being heard in Washington from some large government contractors against the push to give a fixed share of jobs to firms in depressed areas.

The big companies say the government is getting inferior work because of new contract rules favoring depressed areas. They add that in some cases, such as defense contracts, poor work is detrimental to the nation.

The Defense Dept., Small Business Administration, and many other government agencies, have orders to keep contracts flowing into depressed areas. A new government regulation stipulates that firms in areas of chronic unemployment be reserved a share of all contracts from the General Services Administration and other civilian agencies.

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available in pre-enameled steel and aluminum coil in widths up to 60" wide

If you can Form it, Stamp it or Draw it you can MAKE IT WITH COLORKOTE . . . the coated metal with a million uses from . . .

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office, hospital
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COLORKOTE
By ENAMEL PRODUCTS & PLATING CO.
pre-enameled steel and aluminum in coils 60" wide
means lower manufacturing costs!

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TECHNICAL ASSISTANCE!

If your product is not listed here, inquire: Enamel Products & Plating Company's experienced industrial engineers and product designers are at your service to help apply **COLORKOTE** to your product.

Exporters May Get New Credit Insurance

The Export-Import Bank seems headed for a combine with private insurance companies. Purpose: To give U. S. exporters the long-sought-after protection against credit risks.

The new insurance program is designed to enable American exporters to offer more favorable credit terms to foreign buyers. And it's expected that the move will help U. S. companies meet the foreign competition in these markets. The Bank insures only political risks at present.

Under the new system, one comprehensive insurance policy could be made available to exporters by the private insurance companies. The Eximbank would continue to insure against political risks. The Bank would also assume some of the credit risk.

More U. S. Industries Build in France

U. S. industrial operations in France are growing rapidly. And, according to Paul Farish, head of the American Chamber of Commerce in Paris, new plants are going up at about twice the comparable U. S. rate.

He also notes that there is a big labor shortage in France. This is due, of course, to the Algerian war. Nevertheless, he says labor rates are being held down by the government and he pegs them at about 42 pct of the U. S. equivalent.

German Carmakers See Potential Sales Rise

The German auto industry looks for the sales outlook to improve when Great Britain joins the Common Market.

The reasoning: British automakers will lose the price advantage in the European Free Trade Area (Outer Seven) when they join with the European Economic Community.

Growing British price advantage, resulting from higher import duties levied by EFTA on cars from EEC, has been viewed with some apprehension by Germany.

Speculation is that the British auto industry will find it very hard to penetrate the highly-competitive EEC market.

VW Looks For Another Big Year

Volkswagen of America expects to sell 235,000 vehicles in the U. S. in 1962. C. H. Hahn, general manager of the company, says sales predictions call for 200,000 cars and 35,000 trucks.

He predicts the import market in the U. S. next year will total more than 400,000 vehicles. This means VW will end up with more than half of the business. (For more on VW, see page 81.)

The VW-1500, a new line for Volkswagen, will be shown publicly in Frankfort, Germany, soon. However, the model will be built in small volume. There are no plans to bring it to America until production is great enough to make it available in quantities.

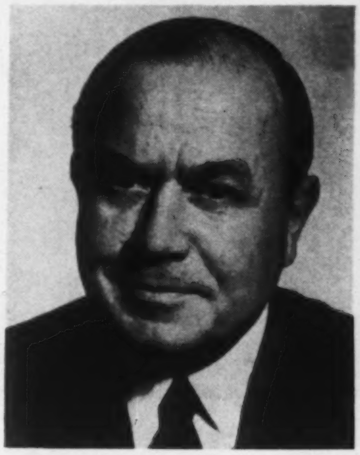
British Tool Orders Continue Strong

New export orders are flowing into British machine tool makers at a rate high enough to offset lower domestic orders. As a result, order backlogs are lengthening.

Over the first six months, export orders have jumped 11 pct from the same period of 1960. Quicker delivery dates help out in Europe's over-booked machine tool industry.

Europe's Industries Are Planning Ahead

One of West Germany's leading steel executives feels expanding economic integration in Europe is "creating economic conditions similar to those in America." This, he says, means European industrialists will have to plan further ahead for large-scale industries.



SOHL: Europe is planning.

Dr. Hans-Guenther Sohl, president, Thyssen Steel Group, made his comments at the recent International Industrial Conference in San Francisco.

Notes Dr. Sohl: "The fact that Europe is now rapidly adopting planning techniques pioneered in America reflects the fundamental change taking place in its economics."

The European Community for Coal and Steel was the first major step toward this integration, says the executive. The subsequent creation of the European Common Market—and now Great Britain's entry—has intensified the trend.

Dr. Sohl claims private business must "take the initiative in all planning" in order to limit government "incursions into economic sector."

SANDVIK *"Tortures"*

SPRING STEEL

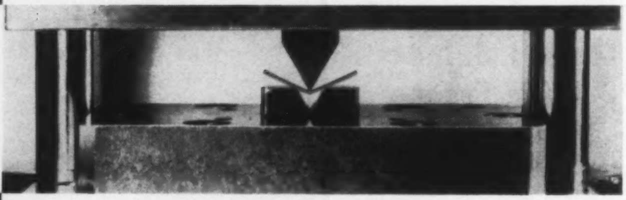
To Give You *Predictable Performance*

Here are a few of the laboratory tests Sandvik uses to determine exactly what specific Sandvik spring steels can endure.

Sandvik's scientific testing and rigid quality control insure consistent, superior performance in spring steel applications.

◀ A Sonntag machine testing the fatigue life of Sandvik steel sample by subjecting it to alternate bending stresses. Other types of test machines known as high frequency pulsators are used to apply tension-pressure stresses or pulsating tension stresses. These tests are performed to achieve maximum toughness to assure predictable end product performance.

The bending properties of a Sandvik spring steel are tested in an excenter press. Stresses are varied by changing the angle and bending radius of the tool, so as to assure maximum formability and high hardness. ▶



◀ Samples of Sandvik stainless spring steels being tested in a corrosion chamber simulating field conditions to develop maximum corrosion resistance in conjunction with desired fatigue characteristics.

Ask your nearest Sandvik office for further information or technical assistance on your spring steel requirements.

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Fair Lawn, N. J., SWarthmore 7-6200 • In N. Y. C., ALgonquin 5-2200
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SS-239

Spring Steel
Steel Belt Conveyors
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SANDVIK

Aluminum-Rubber Marriage

Successful joining of aluminum to rubber is now on a production basis. In the process, aluminum sheet or foil is permanently vulcanized to a rubber backing. The resulting composite mates surface toughness and corrosion resistance with insulative properties and flexibility. It looks good for long-wearing tire cords and as a flexible pipe or tubing material.

Competes With Stainless

Teaming up two well-known gas-alloying processes has resulted in a low-cost, chromium-"clad" sheet steel with the characteristics of stainless. Application will be for those products requiring heat and corrosion resistance. Because chromium is diffused into, and alloyed with the steel, the chromium-rich surface does not flake or peel off during fabrication. It's expected that full size coils of the new steel will soon be available.

Welder "Walks Up" Joint

Using three magnetic feet, a "walking" welder joins heavy structural members on the construction site. Alternating magnets propel the unit up the vertical gap formed between pairs of aligned plates that are slated for joining. The Russians claim this novel electroslag welder can fill 2-in. weld gaps. It's also twice as fast as conventional submerged-arc welding methods.

Aluminum and Corrosion

Does aluminum resist corrosion when it's in contact with other metals? According to a recent study, the answer is a qualified yes. Contact with zinc or cadmium is recommended in water and normal atmospheres; while contact with many other metals is also possible in certain cases. However, in sea water and marine atmospheres, contact with any metal other than zinc or cadmium results in marked corrosion.

Weld Malleable Iron?

Contrary to popular belief, malleable-iron castings can be joined satisfactorily by several arc-welding methods. Recent research indicates that even inexpensive low-hydrogen electrodes are up to the task. However, time of exposure to heat, size of the weld and joint stresses must all be considered to achieve top-notch results.

Key to Fatigue Strength?

Metal fatigue is the designer's nightmare. Most of the trouble stems from lack of understanding its exact causes. However, the National Bureau of Standards may have come up with an important clue. They've discovered that dodecyl-alcohol coatings on copper-beryllium test bars increase fatigue life up to 500 pct. These polar films also boost steel and aluminum fatigue properties. This development could lead to coatings that reduce costly overdesign of metal parts.

Cobalt Gains Ductility

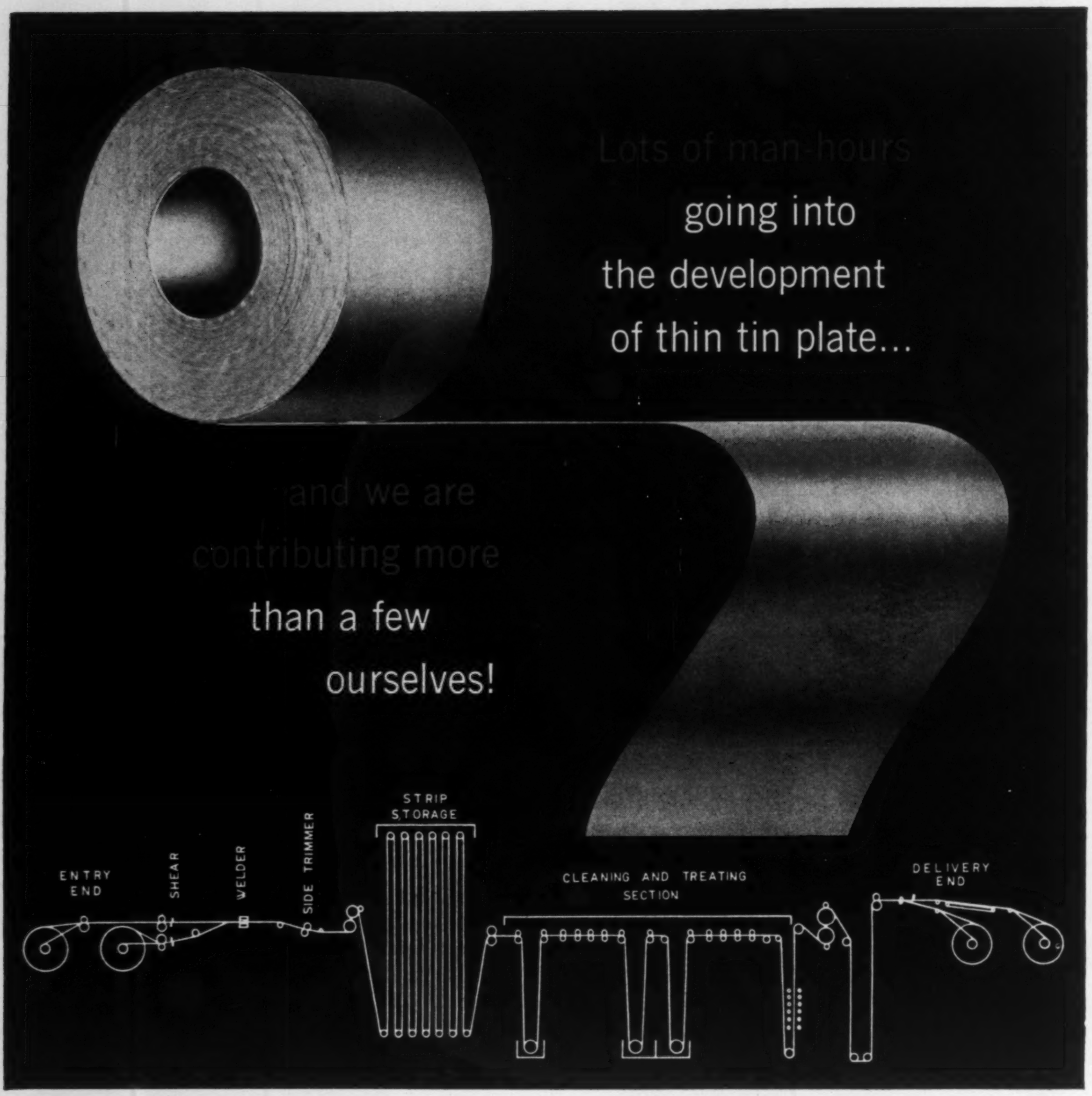
A breakthrough in the technology of producing workable cobalt metal will soon be announced. To date, cobalt's brittleness has defied attempts to fully utilize the metal's excellent corrosion resistance, good magnetic properties and high-temperature strength. A new strip-rolling process yields cobalt coils with 15-pct elongation. One of these ductile coils will be displayed in Detroit at the Canadian Government's booth during the forthcoming Metals Show, Oct. 23-27.

Low-Cost Tensile Test

Metal-foil disks can substitute for the familiar tensile-test bar. In a new-type of test, oil is pumped under a disk that's held down by a ring. This pressure bulges up the disk. Permanent bulge height and the corresponding oil pressure indicate yield point of the disk metal.

Fibers Beef Up Superalloys

Studies, now in progress at Horizons Inc., Cleveland, center on the reinforcement of metals with ultrahigh-strength fibers of alumina. This research effort has led to a practical method for incorporating alumina whiskers into metal matrices. Fibers are prewetted with alloy by a brazing technique. Then they're mixed with metal powders, extruded with enough reduction to produce proper fiber alignment, and sintered.


Lots of man-hours
going into
the development
of thin tin plate...
and we are
contributing more
than a few
ourselves!
ENTRY END
SHEAR
WELDER
SIDE TRIMMER
STRIP STORAGE
CLEANING AND TREATING SECTION
DELIVERY END

The trend toward new products, with emphasis on lightness and strength, puts the night lights back to work.

Lots of man-hours are going into these developments, such as thin tin plate and light wall pipe and tubing. We are contributing more than a few ourselves. We should. We are a major supplier of equipment, and what's good for the industries we serve is good for us.

More important, we do have a lot of knowledge and experience to draw on. We have been building equipment for handling and processing sheet and strip, as well as bars, tubes and pipe for a good many years.

300 Sixth Avenue
Pittsburgh 22, Pennsylvania

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Blaw-Knox designs and manufactures for America's growth industries: METALS: Rolling Mills • Steel Processing Lines • Rolls • Castings • Open Hearth Specialties • PROCESSING: Process Design, Engineering and Plant Construction Services • Process Equipment and Pressure Piping • CONSTRUCTION: Concrete and Bituminous Paving Machines • Concrete Batching Plants and Forms Gratings • AEROSPACE: Fixed and Steerable Antennas • Radio Telescopes Towers and Special Structures • POWER: Power Plant Specialties and Valves

LETTERS FROM READERS

Reader's Comments

▪ **IRON AGE Editor-in-Chief Tom Campbell's Sept. 7 editorial entitled "To Our Readers: Please Hear This!" has brought many letters from readers. Some of these letters follow.—Ed.**

Sir—Your editorials are as refreshing as a cool mountain stream. They are a far cry from the usual run of the mill "isn't our President wonderful; he has made mistakes but he is so young and inexperienced; give him time to mature" type that we read in so many publications. Keep up the good work—Paul A. Vehr, Glendale, O.

Sir—I have been a reader of IRON AGE for perhaps 35 years. In the past year your editorials have been very important inasmuch as you have been stating facts as they are. I have been passing these on to my associates who agree that you are right. It's very refreshing to find that some editors are still thinking of the welfare of America.

Your editorial of Sept. 7 prompted this letter. From it I discern that there are some who feel you have been out of order by what you have been writing. I am of the same mind as you. And I, too, have been orally spanked by many persons who have not been willing to look facts in the face and see what was going on in this country of ours. —William Lloyd, president, Boyle Metalcraft Corp., Brooklyn, N. Y.

Sir—Once again I want to add my vote of approval to your timely editorials. I do wish there were more people in government like you —thinking of the people and the Republic both in domestic and world affairs. My congratulations to you.—D. M. Fadenrecht, New Britain, Pa.

Sir—Keep it up. Hit harder. Some time I get so mad I feel like kicking the guts out of you. But deep within me I like it and appreciate it. I need more of this. The shortage of men like you is the deplorable weakness of our present day life.—John A. Bitterli, Chicago, Ill.

Sir—Your editorial in the Sept. 7 issue struck a responsive chord with me. To me, one of the greatest dangers to our form of government is the acquiescence on the part of the public to the lack of integrity in government as well as industry. I am glad to find at least one editor who does not curry to the sloppy attitude on the part of the public—H. Robinson Hyde, The National Screw & Manufacturing Co., Cleveland.

Attitude's Effect

Sir—Upon reading the Special Report "Senators Launch Attack Against 'Phantom' Steel Price Hikes" in the Aug. 31 issue, the following occurred to me as the effect of this attitude towards business by these "champions of the people."

First, and a personal effect, is that they are undermining a dear and important interest of mine—the size of my pay check. There is nothing that discourages pay raises like low company profits.

Second, it is ironical that corporate profits—the same upon which these illustrious Senators frown—go, for the most part, to the Federal government. How much of the corporate profits go to Uncle Sam? A conservative estimate would be 65 pct. And then there are the local governments.

So why do these "protectors of the people" with their attacks on corporate profits as being evil, justify the ultimate result on the government treasury? In other words, if a Senator is against corporate profits he is against the people's interest. It seems to me that the vote-getter could select a better scapegoat.—Walter L. Crow, Arvada, Colo.

THE INSIDE STORY

This P&K Microdrawn® tubing solved a serious fuel line corrosion problem in jet engines. The answer: seamless tubing microfinished internally by a special P&K process. No grinding or polishing . . . no cavitation or particle removal problems.

Posen & Kline produces Microdrawn® stainless steel and nickel alloy tubing up to ⅝" OD in every conceivable finish, shape, tolerance, and ID to solve your tubing problems . . . satisfy demanding tubing needs.

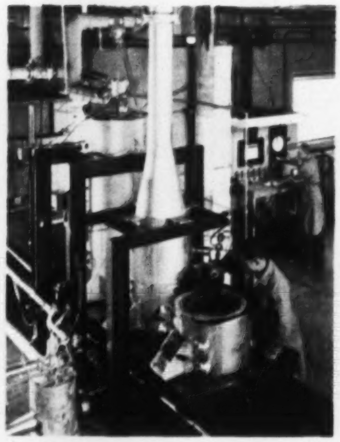
Facts in Catalog 10. Posen & Kline Tube Company, Inc., Box 549, Norristown, Pa.

A subsidiary of Handy & Harman

P&

Agglomerates, Researches, Docks,

Concentrates, Handles, Builds

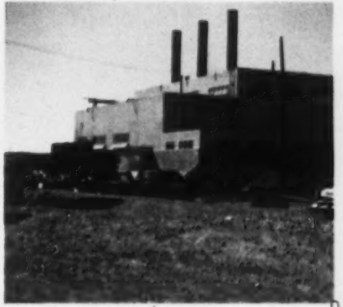


RESEARCHES: Dravo research explores agglomeration processes and establishes bases for plant design of complete pelletizing, sintering and briquetting facilities. Second Dravo-Lurgi ore pelletizing plant for a major metal producer is underway. Dravo-Lurgi iron ore sinter plants account for 45% of new U.S. capacity added in last 5 years. Mail coupon for facts.

DOCKS: Large barge fleets dock at this steel company riverside facility to deliver raw materials or pick up outgoing shipments. Dravo pioneered cellular, sheet pile dock construction and has built them of all sizes for all types of industry. Dravo's 60 years' experience in heavy and marine construction can help you on projects such as docks, harbors, shafts, tunnels, foundations, water intakes. Check coupon below for information.

CONCENTRATES: Interior of a Dravo-Lurgi magnetizing-roasting kiln, where low grade, non-magnetic ore is reduced to synthetic magnetite for separation by conventional equipment. Two pilot plants, one 10-ton per hour and one 2-ton per hour, are now in service in U.S. Use coupon for data on ore beneficiation processes.

HANDLES: 15-ton capacity ore bridge handles stocking and reclaiming needs of large steel producer's expanded yard. Dravo ore and coal unloaders and container cranes speed handling at mills, industrial plants, power stations, terminals and ports. For information on this equipment, check and mail the coupon.



BUILDS: One of five turn-key steam plants built for major auto maker. Other construction services include Dravo-Linde AG air and gas separation and Stora-Kaldo oxygen steelmaking plants; power and compressor stations; piping, machinery, pumping and water or waste treatment installations. Check coupon.

AGGLOMERATES: Total hearth area of 2,419 sq. ft. (13.17′ x 183.75′) makes this Dravo-Lurgi facility the world's largest single-strand sinter plant. Use coupon.

DRAVO

Dravo Corporation, 4780 Grand Avenue, Pittsburgh 25, Pa.

Please send me information on the following products and services

- ☐ Docks, Harbors, Foundations
- ☐ Water & Waste Treatment
- ☐ Ore & Coal Unloaders
- ☐ Sinter Plants & Coolers
- ☐ Pelletizing & Briquetting
- ☐ Oxygen Steelmaking
- ☐ Ore Beneficiation
- ☐ Oxygen Plants
- ☐ Mill Lubrication
- ☐ Turbo Blowers
- ☐ Space Heaters
- ☐ Ore Bridges
- ☐ Towboats & Barges
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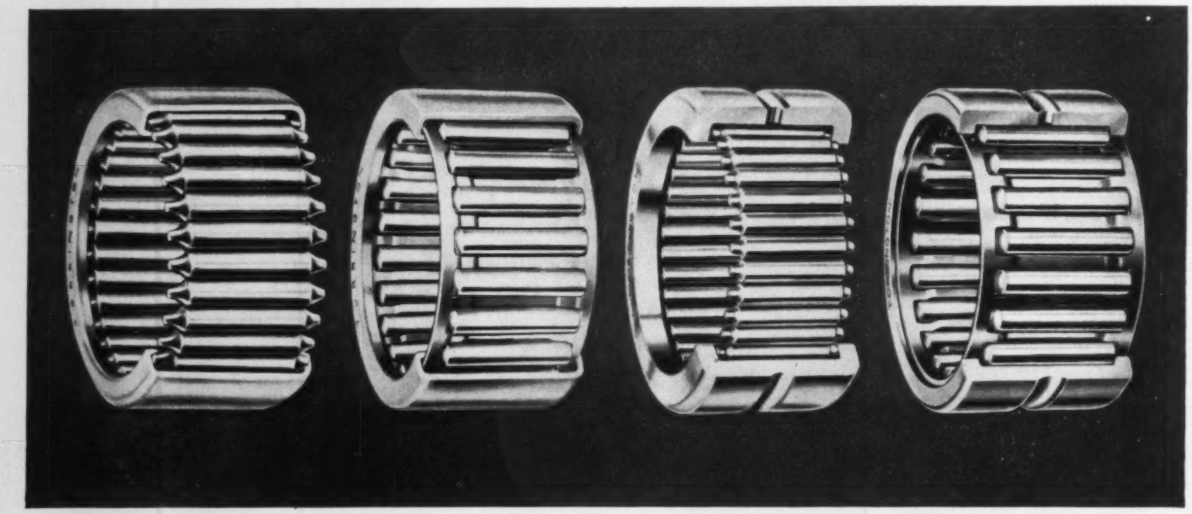
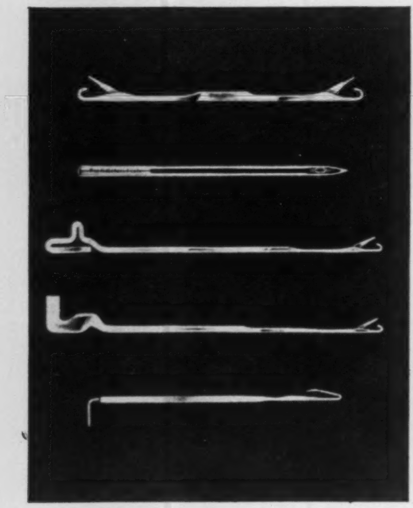
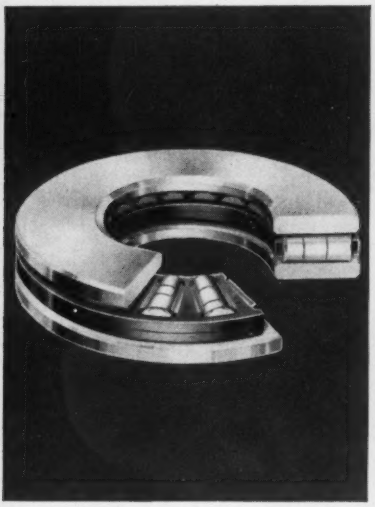
ONLY TORRINGTON MANUFACTURES ALL FOUR OF THESE REVOLUTIONARY NEEDLE BEARINGS...



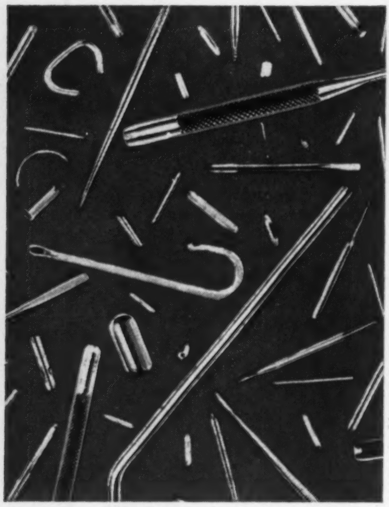
THIS, TOO, IS TORRINGTON



America's largest maker of precision-made machine needles for knitting, sewing, felting, tufting—and a leading producer of surgeons needles.



Specialists in producing thrust bearings of every type, to meet all requirements, from small machine tools to giant radar installations.



America's leading volume manufacturer of small precision metal parts for assembly in a wide variety of industrial and consumer products.

In these and many other fields throughout the world Torrington is contributing to

PROGRESS THROUGH PRECISION

THE TORRINGTON COMPANY
Torrington, Connecticut
Serving industry from plants located in the United States, Canada, England, Germany and Italy

STEELMAKING AT JESSOP

Survival? It could depend on a 3,000-mile picket fence

Ever-vigilant sentinels against surprise attack are the radar installations along the DEW Line. Stretching 3,000 miles across Canada and Alaska, this electronic fence is our first line of defense.

At bleak, lonely outposts Air Force and civilian technicians watch for tell-tale blips on radarscopes—Distant Early Warning of the possible approach of enemy aircraft or missiles.

This all-weather system must withstand the worst of the elements—sub-zero temperatures, high velocity winds, rain, snow and ice storms common to the Far North. And dependability of the equipment could determine whether or not we survive an attack.

There are numerous applications for specialty steels made by Jessop Steel Company in DEW Line installations. For example, forging quality alloys and wear-resistant tool steels for the gear mechanism of a rotating surveillance radar; cast-to-shape steel for certain other component parts and precision ground steels for delicate instrumentation.

Jessop is keenly aware of the importance of built-in dependability in the steelmaking process—whether meeting specifications for steel to be used in the nuclear reactor of a Polaris-firing submarine; a Redstone missile to launch an astronaut; an earth-girdling satellite; or a DEW Line radar installation.

Yes, for dependability, you can rely on Jessop . . . the *big* name in specialty steel.

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Washington, Pa. • Los Angeles • Chicago •
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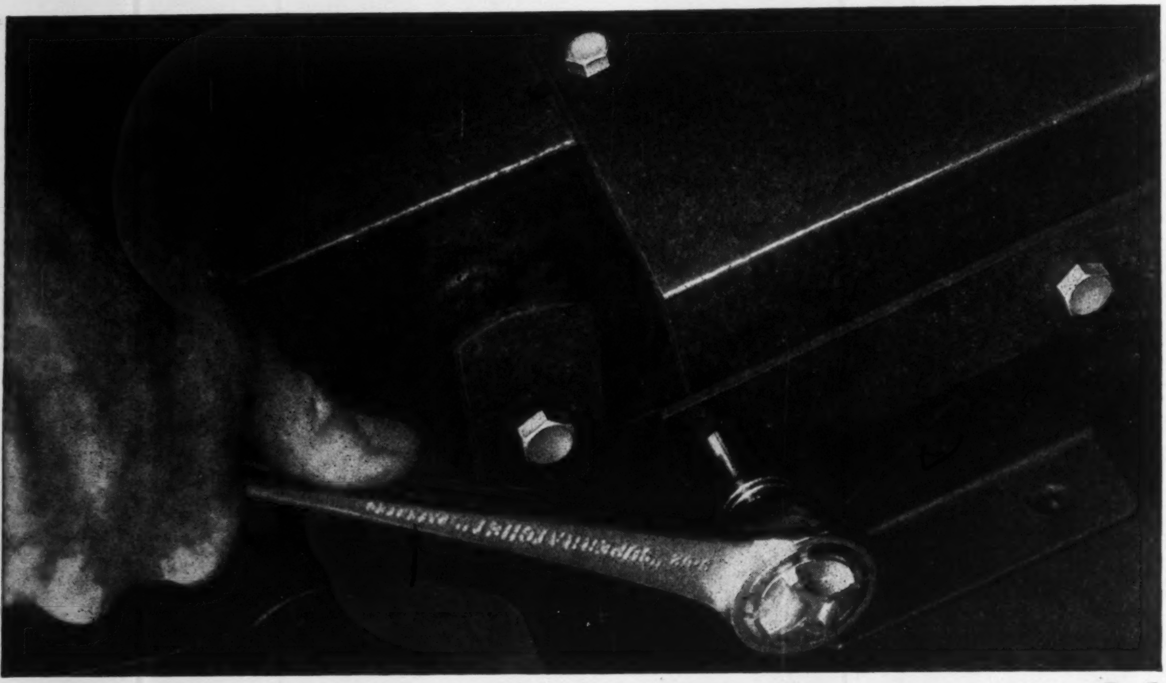
JESSOP



Simple changes save fastener $$

Value analysis of your current fastener practices by RB&W technical advisors can result in substantial cost reductions

Here are typical savings made possible through recommendations by RB&W fastener specialists...made after carefully analyzing product design and assembly upon request.

Manufactured product	Cost Reductions Made Possible
Automatic machine assemblies	$97,000 per year
Cooler-and-condenser units	$16,500 per year
Refrigeration units	$ 7,800 per year
Compressors	$12,000 per year

The striking thing about all these cost reductions is that they required merely a substitution to be realized ...a standard high strength bolt rather than a special alloy fastener ...a hex screw in place of a socket screw. No product design changes were involved.

How about a survey of your own fastening operations? Wherever fasteners are used in quantity, there are bound to be areas where you can shave costs simply by having assembly specifications altered. An RB&W fastener specialist, working with your engineers, can locate them for you. He's no smarter than your own people, but knows his specialty best and also what to look for. Write Russell, Burdsall & Ward Bolt and Nut Company, Port Chester, N. Y.

RB&W
117th year

Plants at: Port Chester, N. Y.; Coraopolis, Pa.; Rock Falls, Ill.; Los Angeles, Calif. **Sales office and warehouse at:** San Francisco, Calif. **Additional sales offices at:** Ardmore (Phila.), Pa.; Pittsburgh; Detroit; Chicago; Dallas.

FATIGUE CRACKS

Upon Reflection

Autoworkers were returning to their accustomed places on production and assembly lines at General Motors Corp. this week. They had a fat, new contract in their pocket. Workers and company were back to work, doing what they do best —building automobiles.

This gave us an opportunity for reflection on the things we do best —keeping IRON AGE readers abreast of, and ahead of, metalworking news.

Early Start—As far back as January we pointed out that the United Auto Workers would demand salaries for hourly workers.

In April we reported that "security" would be the central theme of auto industry negotiations. At that time we made our appraisal of what form demands would take: Larger and longer SUB payments; protection for short workweeks; higher severance pay; company-paid medical-hospital coverage; no pressure for an extra-big wage increase.

Early in June we pointed out that the union would be firm about retaining the annual improvement factor and cost-of-living clauses.

A Look Ahead—In July we pointed out "The Big Three tends to play down American Motors Corp.'s proposals. . . . But they are a bit uneasy as to what AMC might negotiate . . . especially if it settles first."

On the improvement factor and cost-of-living: "There is a good chance that fringe benefits will eat up at least part of the cost of these items. . . ." On the possibility of a strike: "If the parties are still far apart (at the deadline) the strike call could be delayed . . ."; and that a short strike might be called.

What We Do Best—In August the AMC offer and settlement were reported. We pointed out that the union would not press for profit-sharing from the Big Three, but would not settle for fewer benefits than won from American Motors.

Also, we said we believed the UAW would probably concentrate its efforts on GM; that a strike before Labor Day was unlikely; that even a new contract would not guarantee "labor peace in every GM plant."

Preferred Prices

In a recent survey from the Department of the Interior we found IRON AGE pig iron and finished steel price composites quoted.

This brought to mind the great use of IRON AGE price and production data by Federal government agencies.

The Interior Department, as mentioned, uses the prices in its reports on iron and steel. The Labor Department relies on IRON AGE prices in preparing its consumer price index and other price indices.

Other Washington addresses where the IRON AGE is an essential business aid include: the President's Council of Economic Advisers, the Senate-House Economic Committee, and the U. S. Commerce Department-Office of Business Economics.

Total Recall

The impact of a solidly informative article in The IRON AGE apparently never dies. Our editors recently noted that hundreds of requests reach us every week for articles written as long ago as the 1940's.

For example, just this week we received letters asking for reprints of a story carried in the Jan. 20, 1944 issue of IRON AGE. While this isn't as common as other requests, many readers do want copies of articles carried in 1955, 1956 etc.

It all goes to show that the references made to many stories in the magazine go on and on for years after publication.

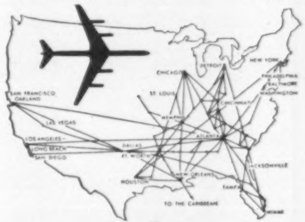
Routine or rush, specify Delta Jet Freight

NEXT STOP: THE MOON

Space helmets to propulsion units, first fly Delta Jet before they zoom to outer space. Delta Air Freight is always faster, often cheaper than surface transportation for routine or rush shipments. Delta has overnight nationwide delivery plus connections to every international destination.

EXAMPLES, DOOR-TO-DOOR:

100 lbs. Los Angeles to Canaveral	$29.85
300 lbs. Miami to Chicago	$28.95

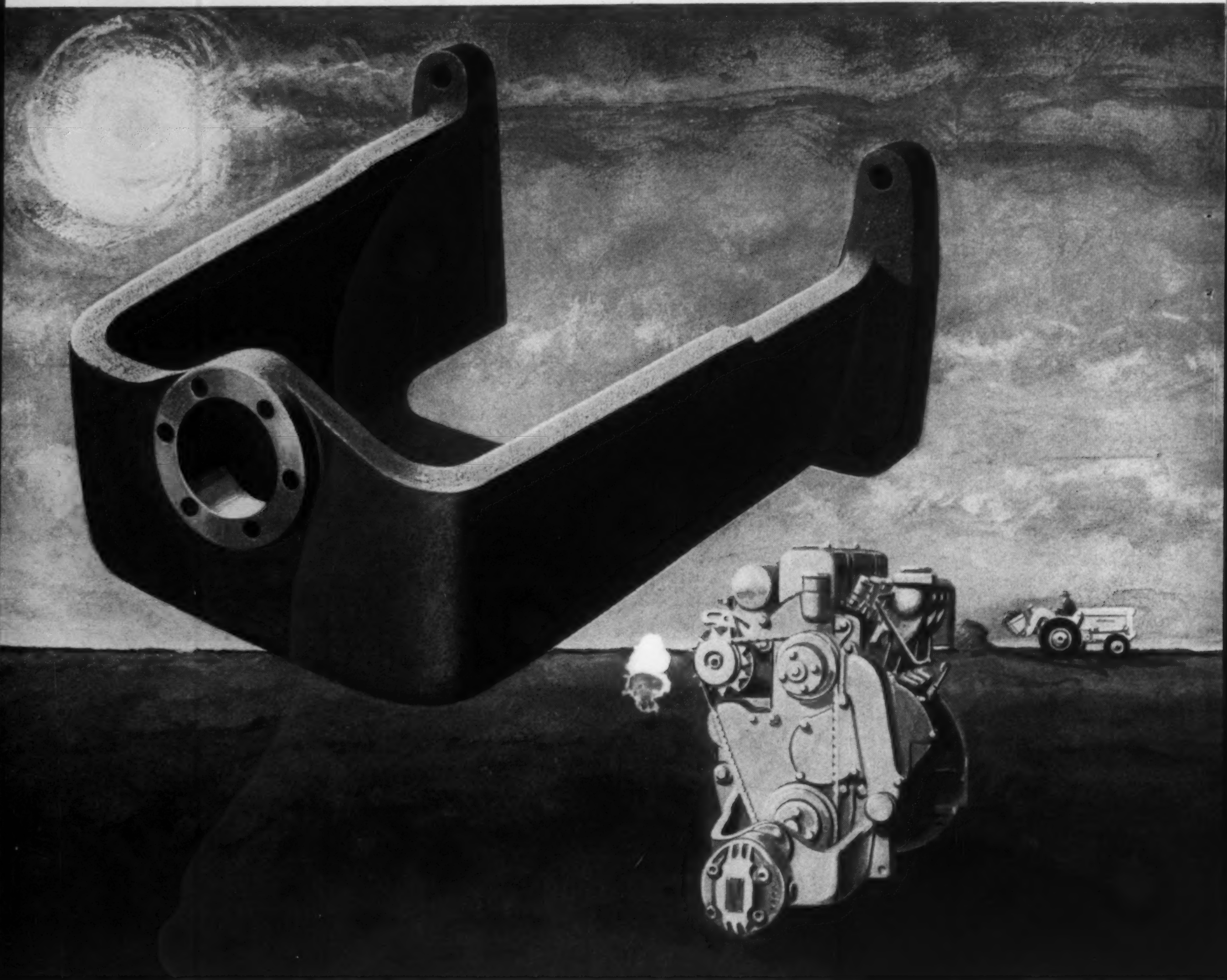


DELTA

the air line with the ***BIG JETS***

GENERAL OFFICES: ATLANTA, GEORGIA

How the Foundry Industry Serves America . . . #17 of a Series



CAST IRON PUMP SUPPORT REPLACES WELDMENT, CUTS COST 43.7%

This casting is a heavy-duty hydraulic pump support. It is used in an industrial front-end loader designed to handle bulk materials. It was originally produced as a weldment, with 99 inches of welding joining its seven major steel parts. Total cost for the finished product was $15.65, including $2.83 for material cost and $12.82 for the 22 separate machining and fabricating operations required.

By redesigning the part to a single iron casting, the manufacturer improved the assembly alignment for service in the field, eliminated 19 of the assembly operations, reduced the manufacturing equipment needed and pared total cost to $8.80—a savings of 43.7 per cent! In addition, product appearance was greatly enhanced.

This is just one more example of how versatile, modern iron castings can solve many of the problems of industrial design and effect substantial manufacturing savings.

For the production of structurally sound iron castings, Hanna Furnace provides foundries with all regular grades of pig iron . . . foundry, malleable, Bessemer, intermediate low phosphorus, as well as Hanna Silvery.

Facts from files of Gray Iron Founders' Society, Inc.

HANNA
THE MOST KNOWN NAME IN IRON

THE HANNA FURNACE CORPORATION
Boston • Buffalo • Chicago • Detroit
New York • Philadelphia

Hanna Furnace is a division of **NATIONAL STEEL CORPORATION**

COMING EXHIBITS

Industrial Building Exposition & Congress—Sept. 25-28, New York Coliseum.

Fleet Maintenance Exposition—Oct. 23-26, New York Coliseum.

Metal Show — Oct. 23-27, Cobo Hall, Detroit. American Society for Metals.

Packaging Machinery Show—Nov. 7-10, Cobo Hall, Detroit. (Packaging Machinery Mfrs. Institute, 342 Madison Ave., New York 17.)

Marine Supplies & Equipment Show—Nov. 15-17, Hotel Roosevelt, New York City.

MEETINGS

SEPTEMBER

American Institute of Mining & Metallurgical Engineers—Fall meeting, Sept. 21-23, Sheraton-Cleveland Hotel.

Metal Cutting Knife Assn.—Fall meeting, Sept. 22, Pittsburgh Hilton Hotel, Pittsburgh.

Pressed Metal Institute — Annual meeting, Sept. 24-28, The Grand Hotel, Point Clear, Ala. Institute headquarters, 3673 Lee Rd., Cleveland.

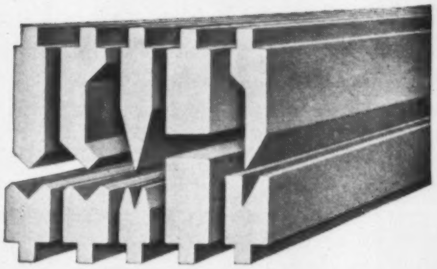
American Welding Society — Fall meeting, Sept. 25-28, Adolphus Hotel, Dallas, Texas. Society headquarters, 33 W. 29th St., New York.

Assn. of Iron and Steel Engineers—Annual convention, Sept. 25-28, Penn - Sheraton Hotel, Pittsburgh. Assn. headquarters, 1010 Empire Bldg., Pittsburgh.

Steel Founders' Society of America—Annual meeting, Sept. 25-26, The Homestead, Hot Springs, Va.

American Hot Dip Galvanizers Assn.—Semi-annual meeting, Sept. 25-27, Sheraton-Jefferson Hotel, St. Louis, Mo. Assn. headquarters,

press brake tooling



***Standard Type* PRESS BRAKE DIES**

62 different sizes and styles • Most in stock for off-the-shelf delivery .

CHICAGO standard type press brake dies are used for a large variety of bending operations in any make or size of standard press brake. They are economical, and the quick delivery saves time in tooling up. Available in any length from 4 to 12 feet in increments of 2 feet; *induction hardened* or Diekrome steel.

The local distributors listed below offer immediate delivery on many sizes and styles of standard type CHICAGO press brake dies. If you have Bulletin STD-959 you can order any standard type die by number. Why not ask your nearest distributor for a copy? Also, if your requirements call for special multibend and forming dies, he can tell you about Dreis & Krump complete tooling service for any make of press brake.

Call your nearest distributor

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Birmingham
Hinkle Supply Co., Inc.
FAirfax 2-4541

CALIFORNIA
Los Angeles
Meyer Sheet Metal Mchry. Co.
MAdison 2-1477
San Francisco
Tay-Holbrook, Inc
MArket 1-6800

GEORGIA
Atlanta
Allison Mchry. Co.
Phone: 875-9488

INDIANA
Indianapolis
E. L. Humston Co., Inc.
WAlnut 5-9691

IOWA
Bonaparte
Corry's Machine & Tool—Phone: 112

KANSAS
Wichita
Ellfeldt Mchry. & Supply Co.
AMherst 7-9773

MASSACHUSETTS
Cambridge
Austin-Hastings Co., Inc.
KIrkland 7-4480

MICHIGAN
Detroit
J. Lee Hackett Co.—TRinity 2-6442
Grand Rapids
Wing and Jabaay—CHerry 1-2125

MINNESOTA
Duluth
Girard Steel Supply Co.
MArket 8-1001
Minneapolis
Minnesota Steel & Mchry. Co.
FEderal 3-6273
St. Paul
Girard Steel Supply Co.
MIdway 6-8635

MISSOURI
Kansas City
Ellfeldt Mchry. & Supply Co.
VIctor 2-5494

NEW YORK
New York
Federal Machinery Corp.
CAnal 6-3022
H. Weiss & Co.
CAnal 6-4256

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Greensboro
Armentrout Mchry. Co.
Phone: 4-8218

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T. R. Wigglesworth Mchry., Inc.
BEdford 2-2660
Columbus
Vorys Brothers, Inc.
AXminster 4-4701
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The Jack H. Ruth Co.
CHerry 3-2196

OKLAHOMA
Oklahoma City
Hart Industrial Supply Co.
REgent 9-2541
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LUther 3-2175

OREGON
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Hallidie Machinery Co., Inc.
ATlantic 2-2244

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OLdfield 9-4600
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WAlnut 2-1734
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Wm. K. Stamets Co.
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EDison 6-5621
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Mehl Machinery, Inc.
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WASHINGTON
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Hallidie Machinery Co., Inc.
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A. R. Williams Mchry. Co., Ltd.

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Edmonton—GE 9-4935

BRITISH COLUMBIA
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Victoria—Phone: 4-7623

MANITOBA
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NEW BRUNSWICK
Moncton —EVergreen 2-0049

ONTARIO
Hamilton—LIberty 9-8420
Ottawa—CEntral 3-4900
Toronto—RUssell 7-0521
Windsor—CLearwater 4-4762

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1010

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DIAMOND PERFORATED METALS

are NOW produced in a NEW streamlined plant to meet Low Inventory Purchasing Requirements

Present-day production managers cut costs by keeping inventories as low as possible and DIAMOND has cooperated . . . by carrying large stocks of materials and delivering finished or partly finished perforated metal parts in lots to meet the purchaser's production schedules.

NOW we have taken another big step to speed deliveries and cut production costs. A New Building . . . additional high-speed equipment and new straight-line operating procedures . . . all combine to assure even quicker service than was possible before.

Write us regarding ANY requirement in perforated metal. Our experienced engineers welcome opportunities to make money-saving suggestions . . . without charge or obligation. Catalog on request.

Diamond mfg. co.
WYOMING (Wilkes-Barre area)
Pennsylvania

MEETINGS

5525 Manning Place, N.W., Washington 16, D. C.

American Welding Society — National fall meeting, Sept. 25-28, Hotel Adolphus, Dallas.

Metal Cutting Knife Assn.—Fall meeting, Sept. 27-28, The Homestead, Hot Springs, Va.

American Society of Tool and Manufacturing Engineers — Meeting, Sept. 27-28, Statler Hilton Hotel, Detroit.

American Die Casting Institute Inc. and The Die Casting Research Foundation—Annual meeting, Sept. 27-28, Edgewater Beach Hotel, Chicago. Institute headquarters, 366 Madison Ave., New York.

American Production and Inventory Control Society — Annual national conference and technical exhibit, Sept. 28-29, Pick-Congress Hotel, Chicago. Society headquarters, 330 S. Wells St., Chicago 6.

Purchasing Agents Assn. — 14th Pacific Inter-Mountain Conference, Sept. 29-30, Westward Ho Hotel, Phoenix.

Metal Powder Industries Federation—Business management meeting, Sept. 29-30, The Greenbrier, White Sulphur Springs, W. Va.

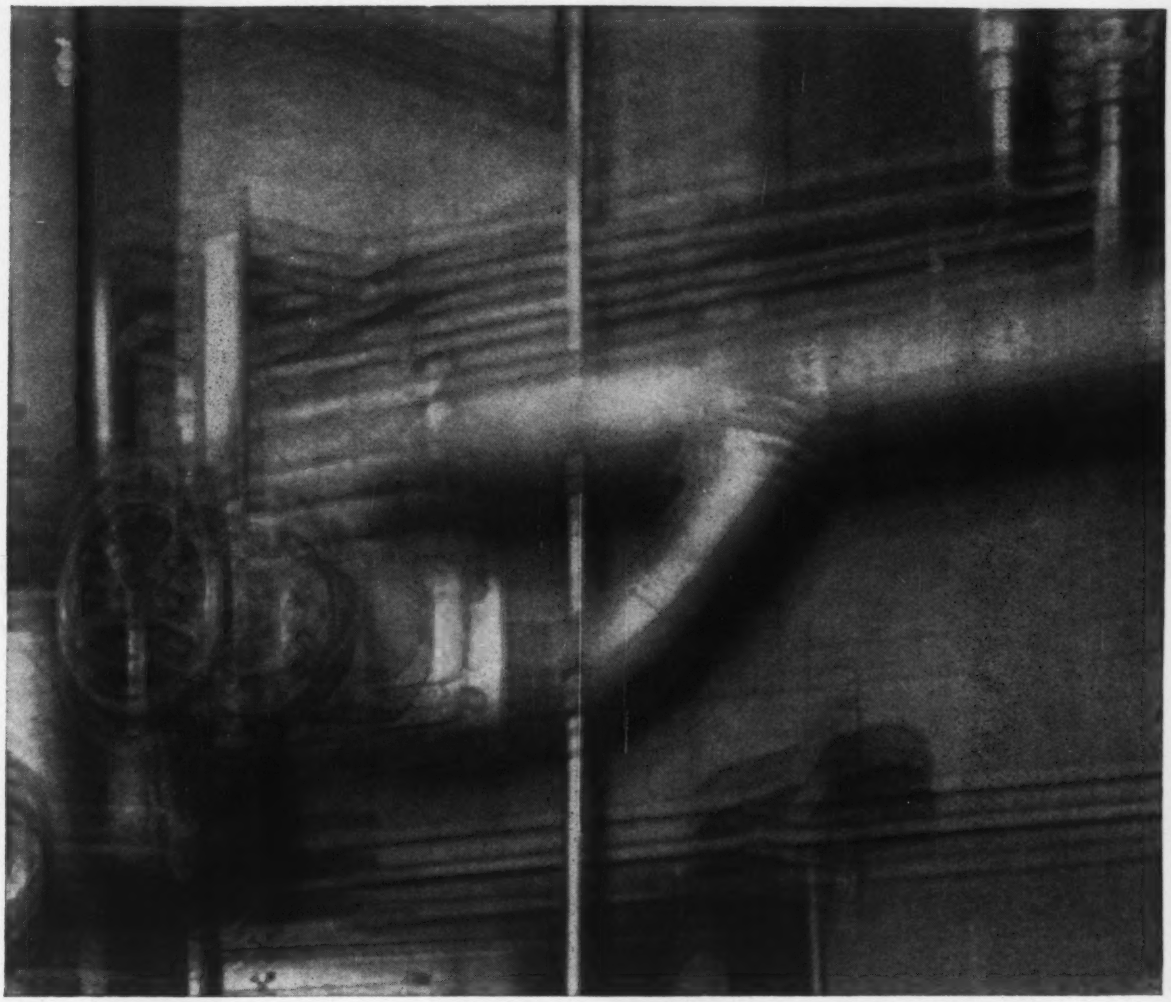
OCTOBER

Steel Founders' Society of America —Product and market development regional sales conferences: Los Angeles, Oct. 2; New York, Oct. 19; Chicago, Oct. 20.

Hoist Manufacturers Assn.—Meeting, Oct. 3, Statler Hilton Hotel, Cleveland. Assn. headquarters, One Thomas Circle, Washington 5, D. C.

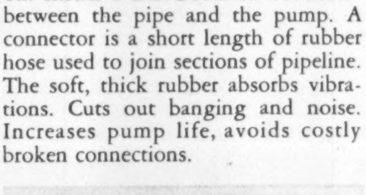
National Assn. of Corrosion Engineers — Western Regional Conference, Oct. 4-6, Benson Hotel, Portland, Ore.

Process Industries Conference— Oct. 4-6, Shamrock Hilton Hotel, Houston.



Tranquilizers for pipes that shake like this

HERE'S a sure cure for pipes that get rattled when the pressure's on. Install a B.F.Goodrich connector between the pipe and the pump. A connector is a short length of rubber hose used to join sections of pipeline. The soft, thick rubber absorbs vibrations. Cuts out banging and noise. Increases pump life, avoids costly broken connections.

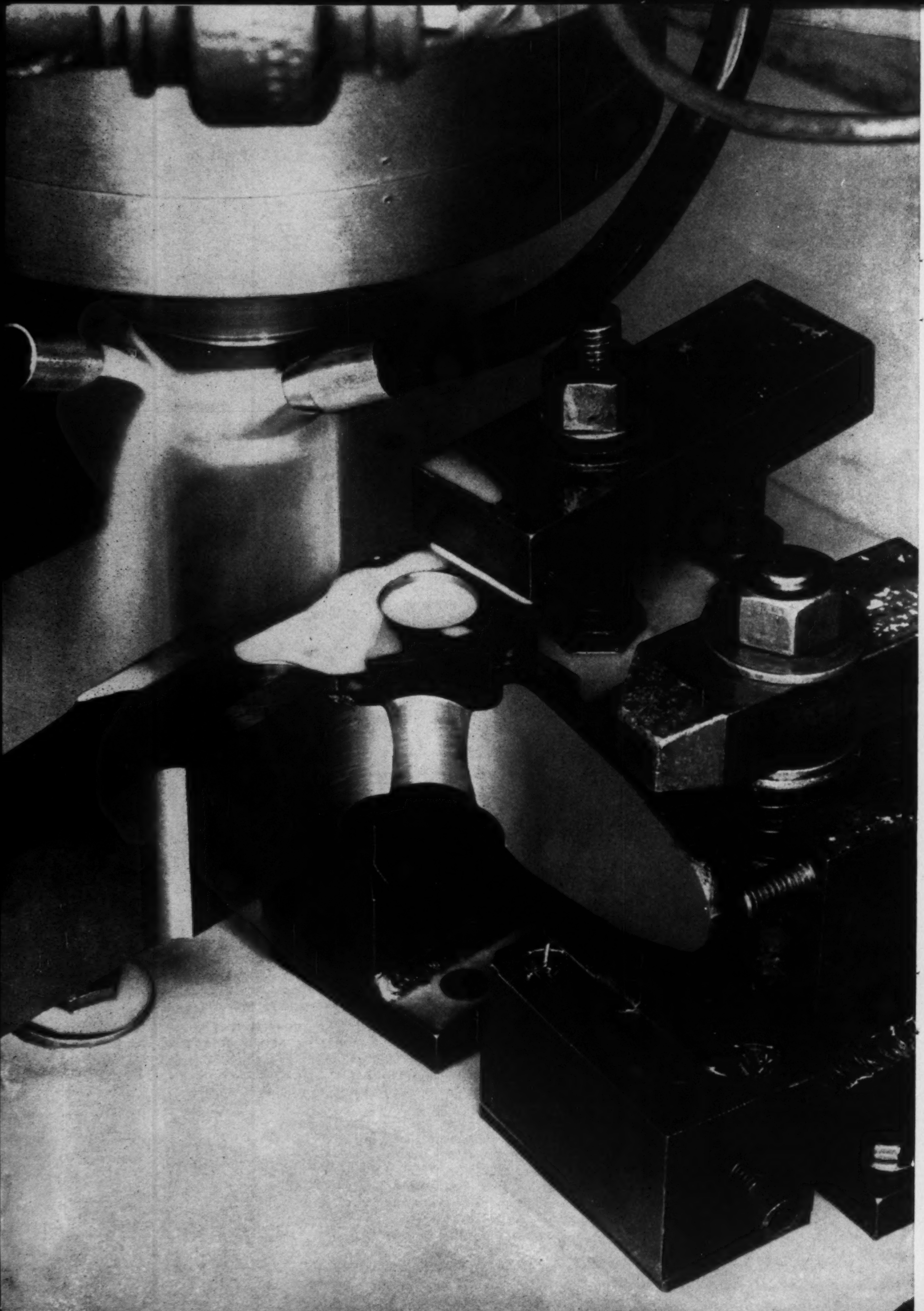


In a midwest zinc plant, pipe on a hot acid line had to be replaced 2 or 3 times a year. Vibration from the pump shook the pipe until it banged, rattled, cracked. Then a short length of the lead pipe was replaced with a BFG Flexseal connector. Its cost $105. And it saved the customer $1000 in the first year alone by eliminating the cause of broken connections, frequent repairs, costly pipe replacements.

In addition to *Flexseal*, B.F.Goodrich has recently announced a new heavy-duty connector, called *Flexlock*, which is built to take working pressures up to 150 lbs. Both Flexseal and Flexlock are made with abrasion and acid-resisting rubber. Both provide full flow connections. Both can be ordered with or without wire reinforcement.

B.F.Goodrich distributors can give you complete details on B.F.Goodrich Flexseal and Flexlock connectors. And as factory-trained specialists in rubber products, they can answer your questions about any of the products B.F.Goodrich makes for industry. *B.F.Goodrich Industrial Products Co., Dept. M-175, Akron 18, Ohio.*

B.F.Goodrich



New Univac Numerical Control System saves Rohr Aircraft up to 66% on machining costs

Less than four years ago, Rohr Aircraft had only one numerically controlled machine tool. Today, Rohr has nine—with numerical control data prepared by a Univac® Solid-State Computer.

Rohr programmers simply describe in mathematical terms the shapes they want machined on a specific machine tool and the Univac Solid-State automatically generates the control instructions that will guide the tool. *Result:* Thousands of metal parts of varied complexity turned out perfectly—and *economically*.

An aluminum upper engine mount, for instance, under conventional machine tooling, used to show a heavy scrap rate. Under numerical control with the Univac Solid-State Computer, the scrap rate is now *zero*.

In one case, a three-dimensionally defined part was produced under numerical control at 1/40th the cost under conventional machining.

Rohr's over-all savings are as much as three to one, a saving of up to 66% on machining costs!

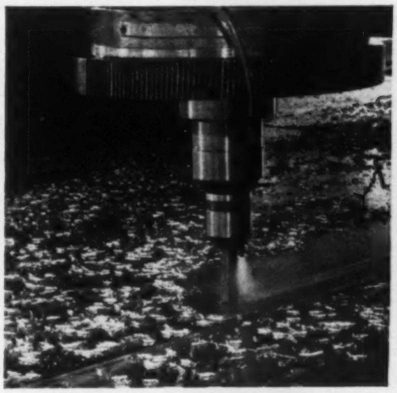
Here's what H. C. Emerson, Rohr Manufacturing Engineering Manager, has to say about the Univac Solid-State Computer: "We chose the Univac Solid-State because of its high storage capacity, fast processing speeds, low costs, availability and versatility. It not only handles our corporate data processing, but its application to numerical control has been extremely successful."

Yes, what's important to all industrial executives is that Univac offers a low-cost, medium scale, general purpose system that not only has proved itself in over 300 commercial installations but, at no additional cost, can handle with ease highly diversified numerical control part programs. Interested? Our local representative will gladly brief you on Univac Numerical Control—for your own installation or through your nearest Univac Service Center.

UNIVAC

DIVISION OF SPERRY RAND CORPORATION

Univac Solid-State controls machining of three dimensional blowout door frame and engine mounting longerons.



Engine mounting box-beam for aircraft, milled from structural steel with help of Univac Solid-State Computer.

Vacuum chuck being milled from aluminum plate with Univac Solid-State produced data.

Take a Close Look at a Piece-Maker®

You'll See Why It's Best for High Speed Automatic Stamping

MINSTER
P2-150-54
Piece-Maker

The superior strengths and values that give a Minster Piece-Maker press the most precision and the best stability for high speed automatic stamping jobs are "hidden" in the Minster design and construction.

That's why it is important to you, when evaluating press equipment for progressive die operation, to carefully compare frame structure, precision of bearing and gib fitting, slide to bed parallelism, eccentric shaft support, lubrication system and control and clutch efficiency. Every size Piece-Maker, 20 through 300 tons, has this superiority. Ask a Minster representative to show you *exactly* why this is true.

The Minster Machine Company, Minster, Ohio

MINSTER®

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Fon Tayne
reflected in
stainless by
Crucible
Steel
Company
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Stainless by

CRUCIBLE

where a fine finish is only the beginning

Which of these parts should be investment cast?

. . . *All* the parts except the milling machine collet at the top right – which is a "natural" for conventional lathe work. Even the helical impeller the men are examining is best made as an investment casting – the helix is undercut in such a way that no cutting tool could reach inside to remove the metal.

"Naturals" for investment casting are usually parts that are too intricate to be made economically by any other process, or involve alloys or quantities that make them impractical to produce by other methods. In other words, when it looks as if you might have to sacrifice a design because its complexity makes the cost prohibitive, or forego a preferred alloy because it is difficult to machine, then it's time to take a long, hard look at investment casting.

But . . . it's not always as easy as it sounds to spot the parts that are "made" for investment casting. That's where the Arwood sales engineer comes in. He knows Arwood expects him to show a customer how to get the most from the process. To help keep your cost down he may have to suggest a filleted radius here . . . or a tolerance opened up there. Then too, on occasion he may readily have to admit the part should not be investment cast at all. However, he also knows that if you just can't have the part made any other way, Arwood will go all the way down the line to have it investment cast for you.

Our five plants cast every castable metal and alloy, including magnesium and superalloys. Each has its own research, tooling, quality control and production facilities. In short, if it can be investment cast, we can investment cast it.

Machine the simple . . . cast the complex

A complete service from design through tooling, production and finish machining. Seventy-one engineering representatives from coast to coast.

arwood

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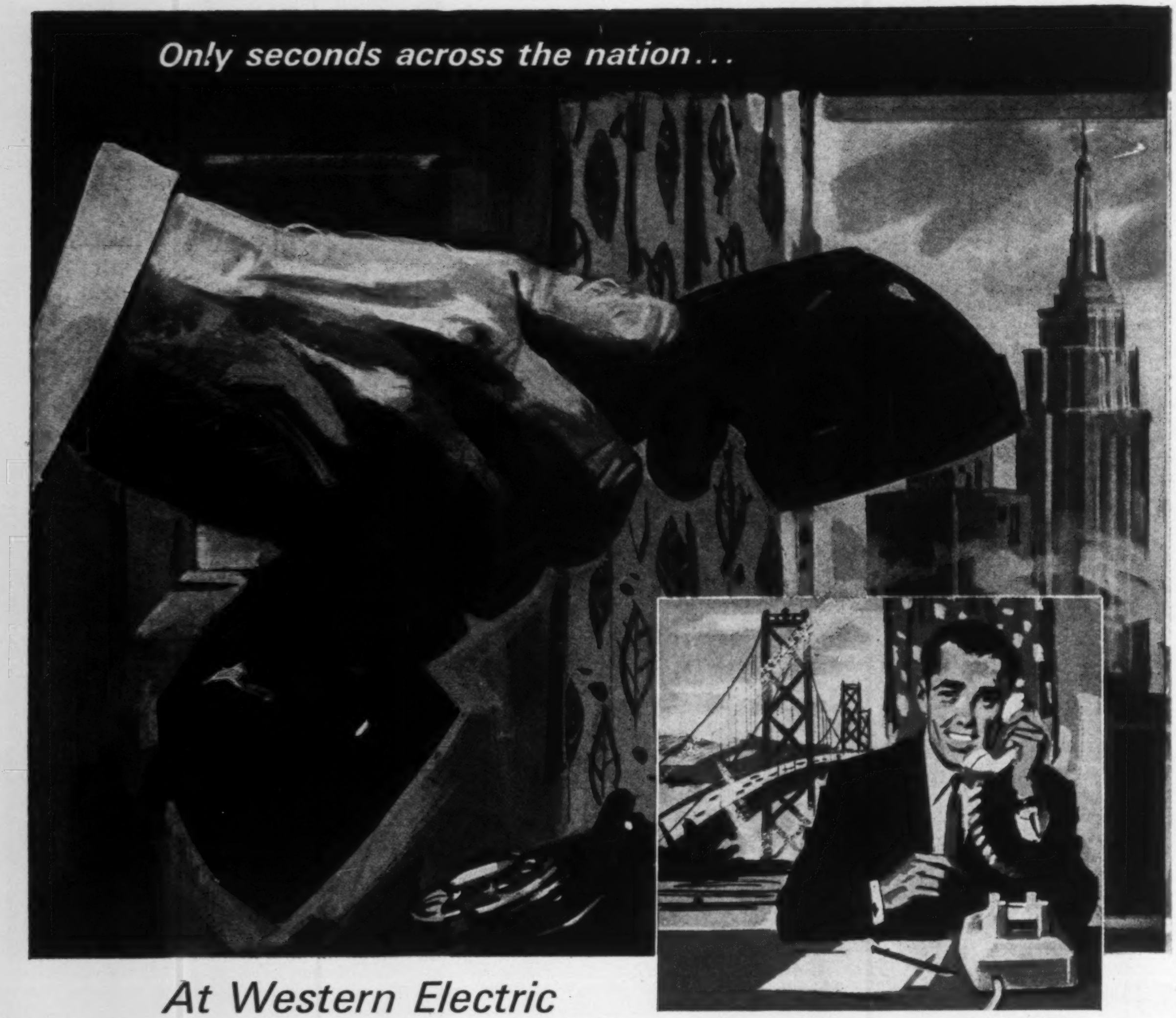
PLANTS IN BROOKLYN, N. Y.; TILTON, N. H.; GROTON, CONN.; LOS ANGELES AND LA VERNE, CALIF.

LIKE TO LEARN MORE ABOUT INVESTMENT CASTING?

Write us for a complimentary copy of our 44-page manual, "Practical Guide to Investment Casting." Among other sections it includes practical tips on designing for investment casting, as well as analyses and physical and mechanical properties of all the metals and alloys cast by Arwood.


Only seconds across the nation...

At Western Electric

MEAKER AUTOMATIC DELIVERS CONSISTENT QUALITY ZINC PLATING FOR MILLIONS OF SWITCH PARTS

How large the world? No more than the minutes it takes to telephone *anywhere!* A pioneer in communications is the Western Electric Company which builds years of rugged service into every piece of telephone equipment produced at its extensive Hawthorn Works, Chicago. Superior performance is a never-ending quest of Western Electric production engineers.

The Meaker "Automatic" was chosen and installed four years ago to zinc plate switch mounting plates and relay covers. These are parts of busy telephone central offices—the communication nerve centers of offices and factories throughout the United States.

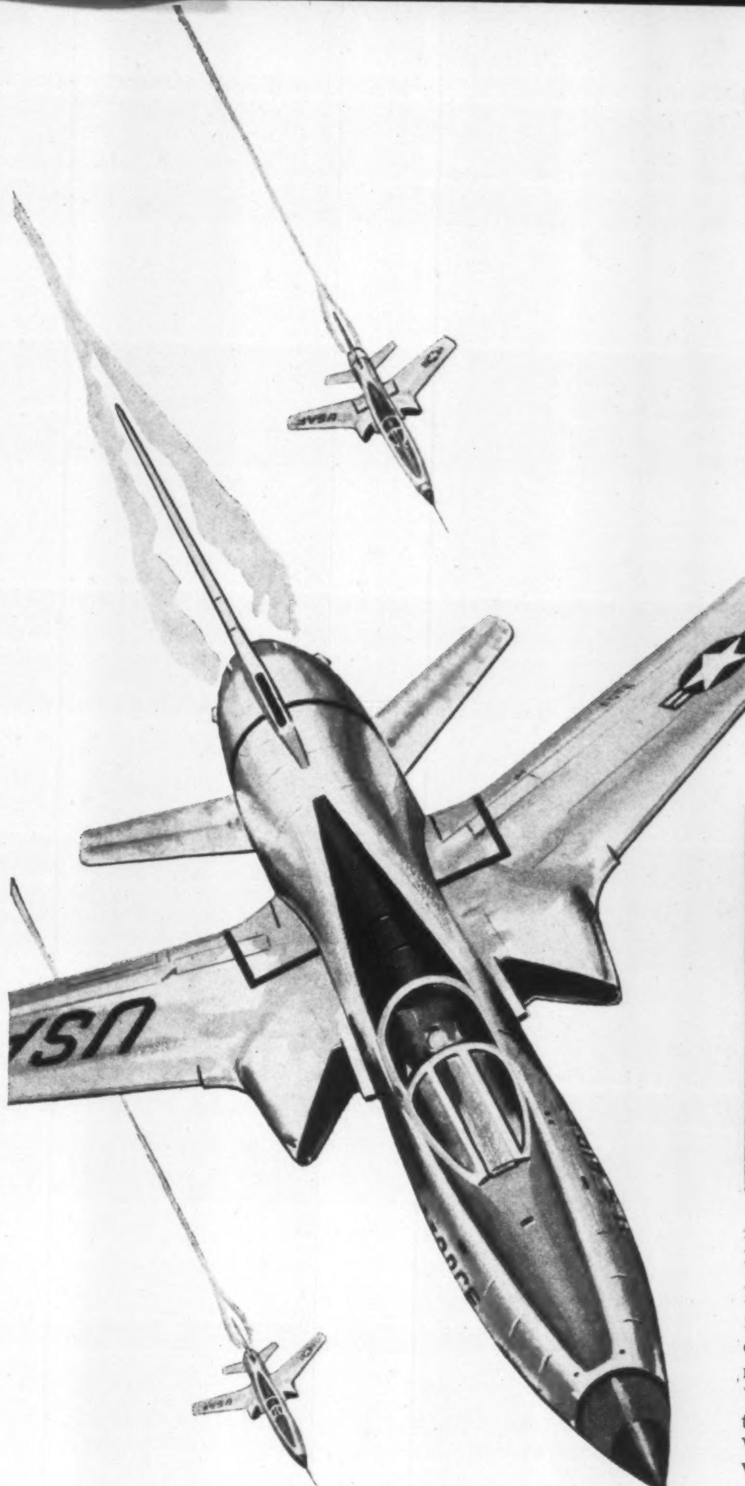
Since 1899, Meaker engineers have been building automatic metal processing equipment. These range from units tailor-made to fit limited floor space and handle modest output to the largest plating installation in the world!

Whether large or small, every Meaker is made to save its owner money—through lower labor costs, greater plating uniformity and greatly improved product quality. Send for our new catalog "When to Automate" which will give you some valuable ideas on improving your profits—and products—through automatic plating or metal finishing.

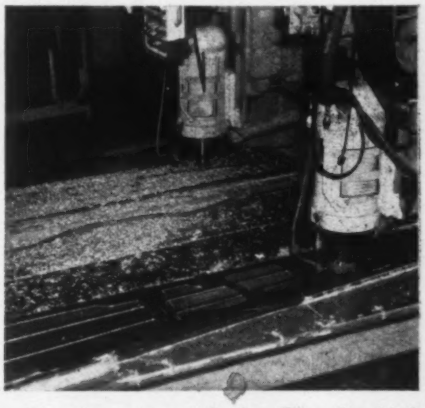
SINCE
MEAKER
1899

THE MEAKER COMPANY
SUBSIDIARY OF Sel-Rex SEL-REX CORPORATION
Nutley 10, New Jersey
Factories and offices Chicago 50, Ill., Los Angeles, Cal. and Nutley 10, N. J.

On the wings of the 'Thunderchief'



. . . the world's most powerful one-man airplane . . . rides much of America's strength in airpower. This Mach 2, F-105D jet is designed primarily for close ground support missions in any kind of weather, day or night. Its speed, maneuverability and aerial firepower also qualify it for duty as an interceptor, a fighter, a bomber and a supersonic tanker. The Thunderchief can climb 8-miles from a standing start in the time it takes a man to walk an average city block, reach heights in excess of 50,000 feet and attain speeds better than 1300 mph. Its strike range is anywhere in the world in a matter of hours and it can deliver more firepower in one strike than was expended by the entire U.S. Air Force during the Korean War.



On the wings of the Thunderchief, Republic Aviation Corporation is using VR-54 carbide inserts with a Giddings and Lewis tape-controlled milling machine to mill the wing spar caps to their exacting dimensions. More and more plants in more and more industries are making V-R their first choice for all their cutting tool needs. Make V-R your first choice. Write for catalog today.

Vascoloy-Ramet Corporation,
878 Market Street, Waukegan, Illinois.

V-R FIRST CHOICE of more and more industries

C-862

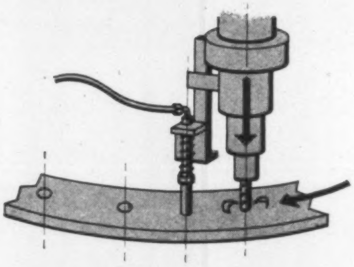
How 1 pneumatic recorder at GE led to 14 more

The first one did such a good job that General Electric's Evendale, Ohio, plant bought an additional 14 Sheffield pneumatic recorders, for application to automatic indexing jig borers.

An adjustable bracket on the quill holds a floating air spindle. After each hole is bored, the spindle enters the hole, automatically records the bore size. If the hole is within limits, the next hole is bored. If the diameter is not within specifications, the operator is warned by both lights and a buzzer.

The Sheffield Pneumatic Recorders proved so reliable that dimensions recorded at the machine have—in many cases—eliminated the need for subsequent inspections.

Write for Bulletin PREC.-212.



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Corporation *Dayton 1, Ohio*

A subsidiary of The Bendix Corporation

Inspection Gages, Dimensional Control Instruments, Machine Controls, Automatic Gaging & Assembly Systems, Measuray® X-Ray Thickness Measuring, Crushtrue® & Multiform® Grinders, Cavitron® Ultrasonic Machine Tools, Press-Pacer® Transfer Units, Large Dies, Tooling, Contract Manufacturing.

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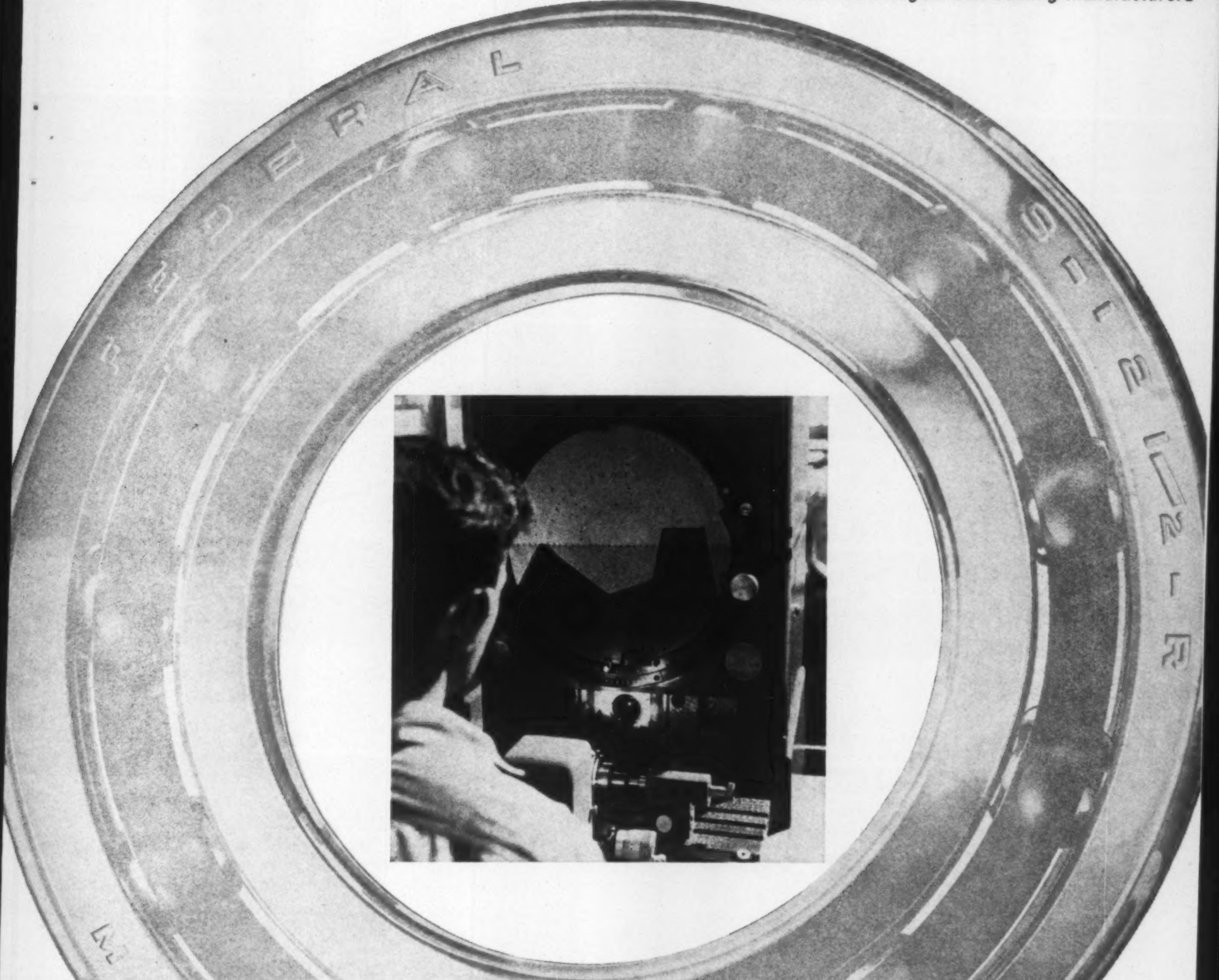
BALL BEARINGS
One of America's largest ball bearing manufacturers



smooth A Federal forming tool must be more than merely naked-eye perfect. When it's magnified 50:1 in this Optical Comparator, and jibes to the letter with blueprint specs — then it's meeting the Federal toolroom standard. Care like this all along the line insures top performance from every Federal ball bearing — radial, angular contact, thrust, self-aligning or shafted. Single or double row. Open or sealed. Hundreds of types, in all sizes. See why so many of industry's best-known names rely on Federal? Send for our catalog today. The Federal Bearings Co., Inc., Poughkeepsie, New York.

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OF COMPLETE STEEL PLANTS

ROLLING MILLS FOR FERROUS and NON-FERROUS METALS
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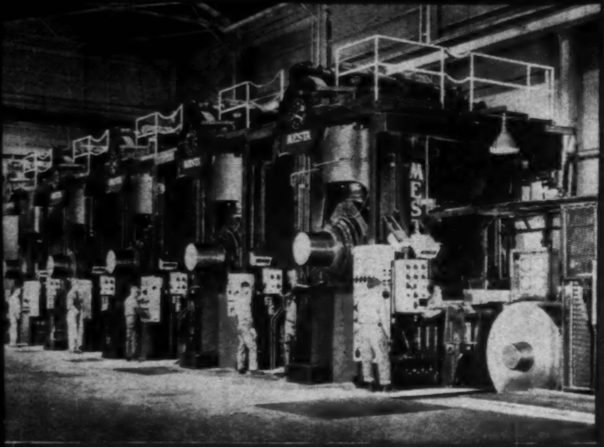
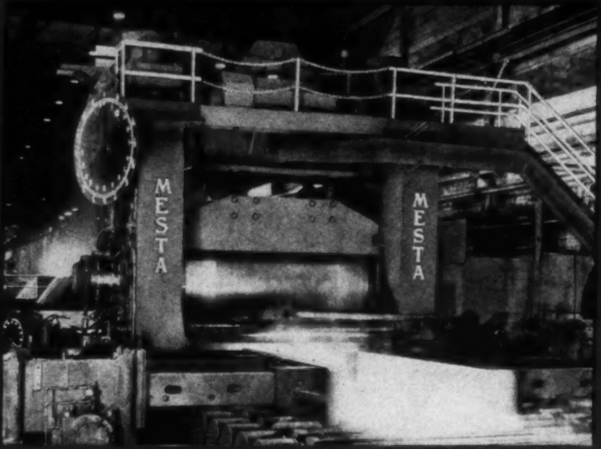
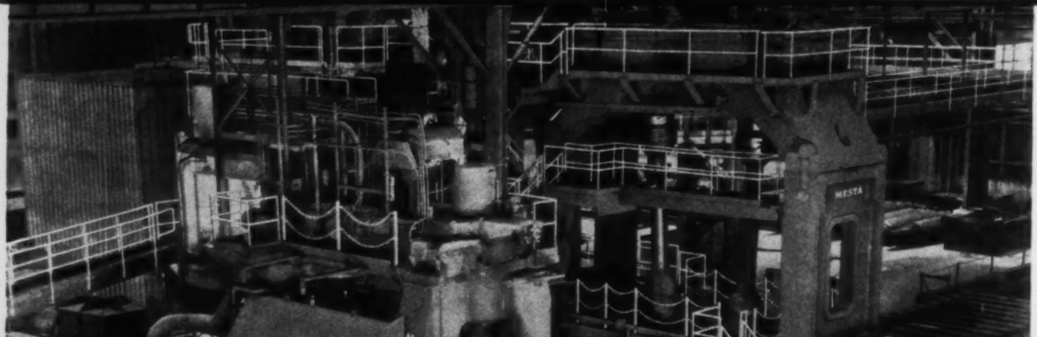
IRON and STEEL CASTINGS
GEARS • FORGINGS



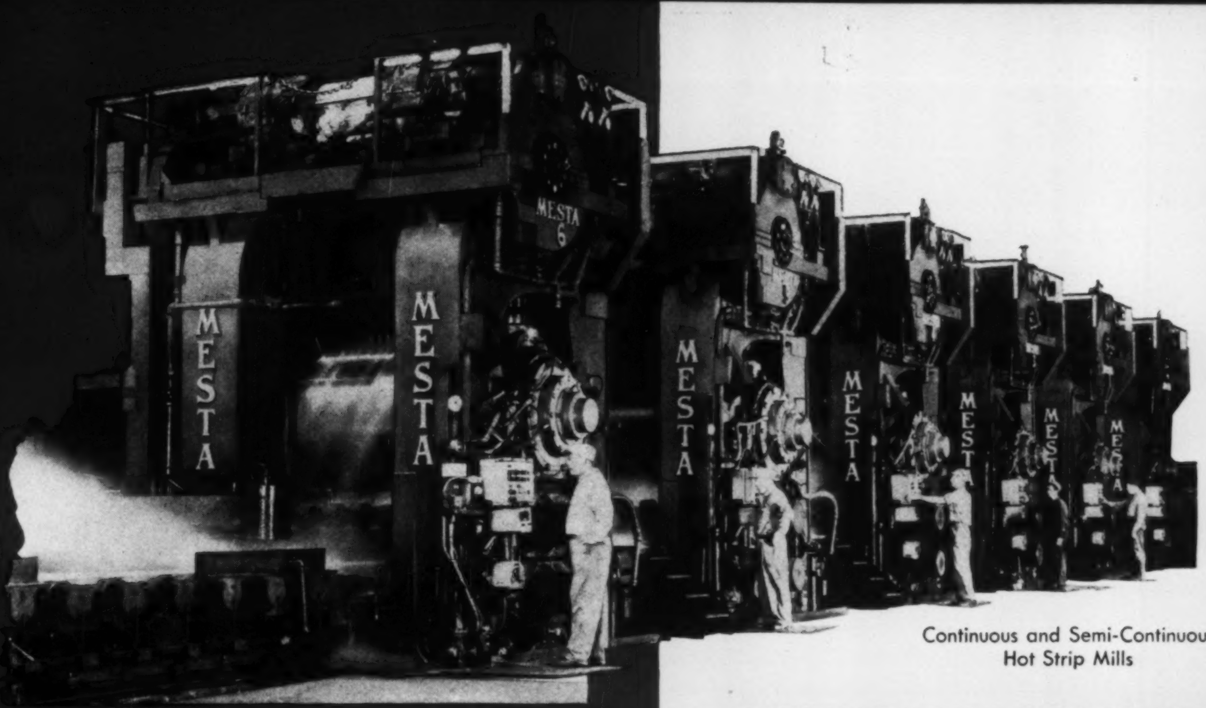
Four-High High-Speed Tandem Cold Mills



Four-High Reversing Plate Mills



Rolling slabs and plates on
Four-High Reversing and
Vertical Edging Mills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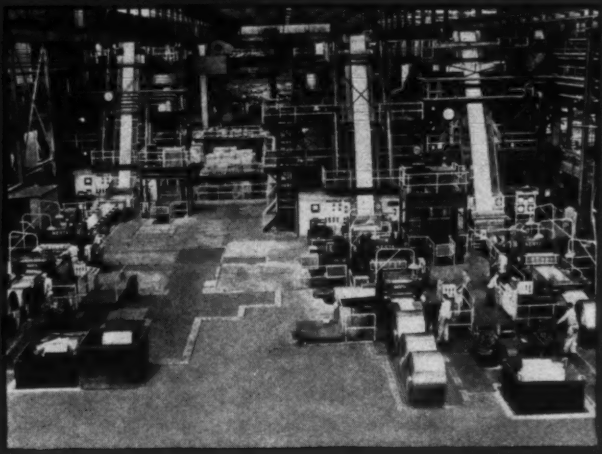
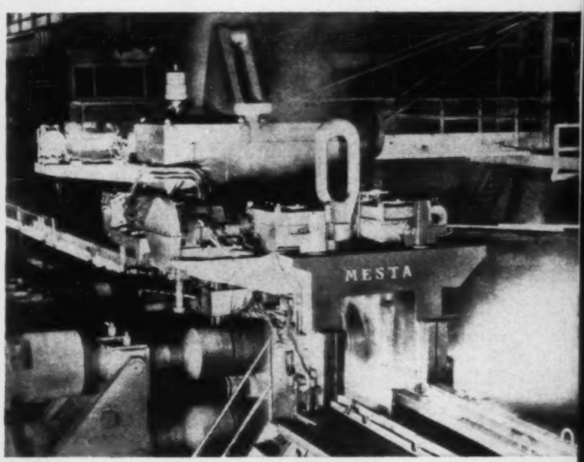
Continuous and Semi-Continuous
Hot Strip Mills



Continuous Galvanizing Lines

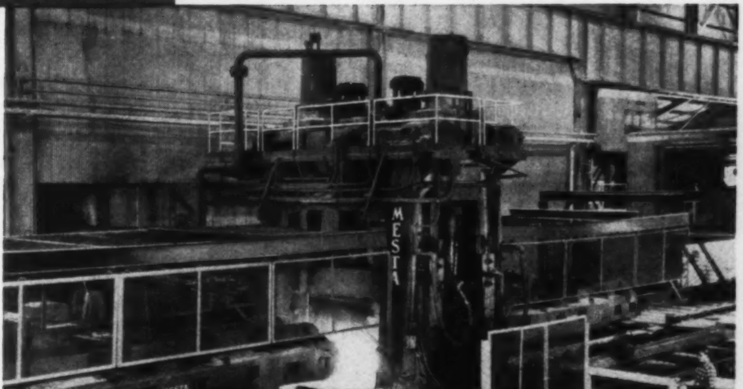


Rolling wide flange beams on
MESTA Universal Structural Mills

MESTA MACHINE COMPANY

PITTSBURGH,

PENNSYLVANIA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Two-High Reversing
Slabbing-Blooming Mills

A MULTI-MILLION DOLLAR INVENTORY

. . . yours on a moment's notice, without a cent of cost before!

Your Steel Service Center offers Republic steel products as near and as quick as picking up your phone . . . materials with pre-delivery processing *done to your order* . . . delivered in your plant *when they're needed*. That's as good as inventory, any day.

Count it as "inventory on hand" . . . and eliminate the too-familiar "costs of possession." No drain on your resources . . . no need to purchase in anticipation of needs that may be weeks away . . . no dollars frozen in inventory . . . no tied-up warehouse space.

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You are close to a Steel Service Center, too. With 1,300 centers across the country, that's certain. If you're not already doing business with one, pick up the 'phone and find out about the multi-million dollar asset you didn't know you had!

SOME OF THE MANY REPUBLIC STEEL PRODUCTS... AND PRE-PROCESSING SERVICES OFFERED BY YOUR STEEL SERVICE CENTER...

In steel: carbon, alloy, stainless, high strength; sheets, strip, bars, plates, pipe, tubing, wire, rods.

Cutting, shearing, flame-cutting, sawing, coil slitting, and grinding.

REPUBLIC STEEL

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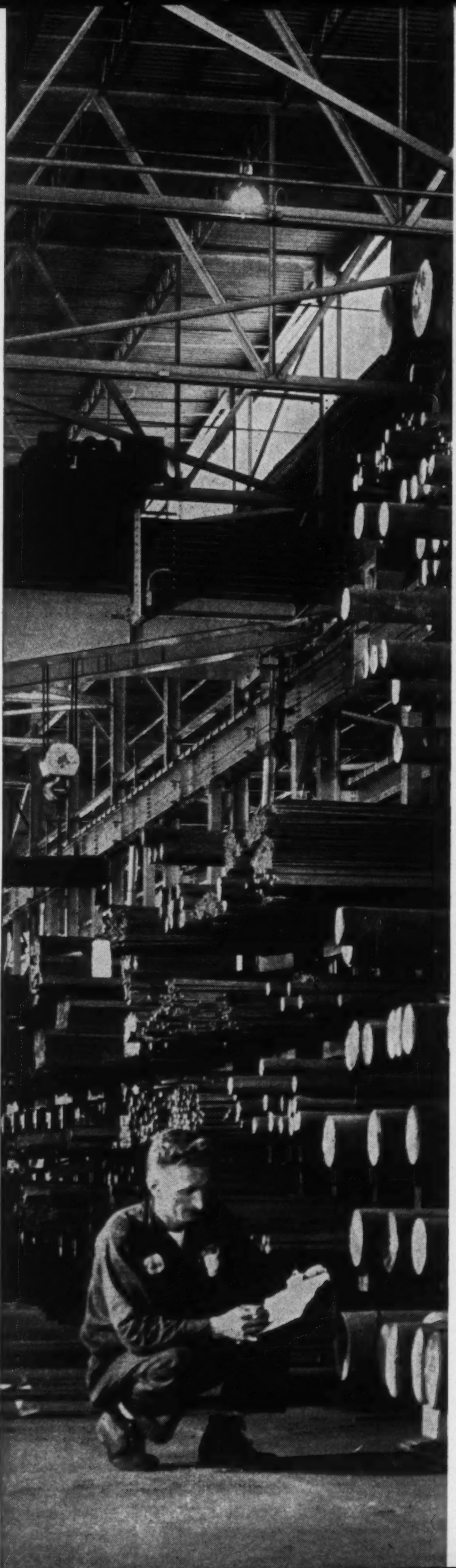
REPUBLIC HAS THE FEEL FOR MODERN STEEL

Steel Strong, Modern, Dependable

STEEL SERVICE CENTER INSTITUTE



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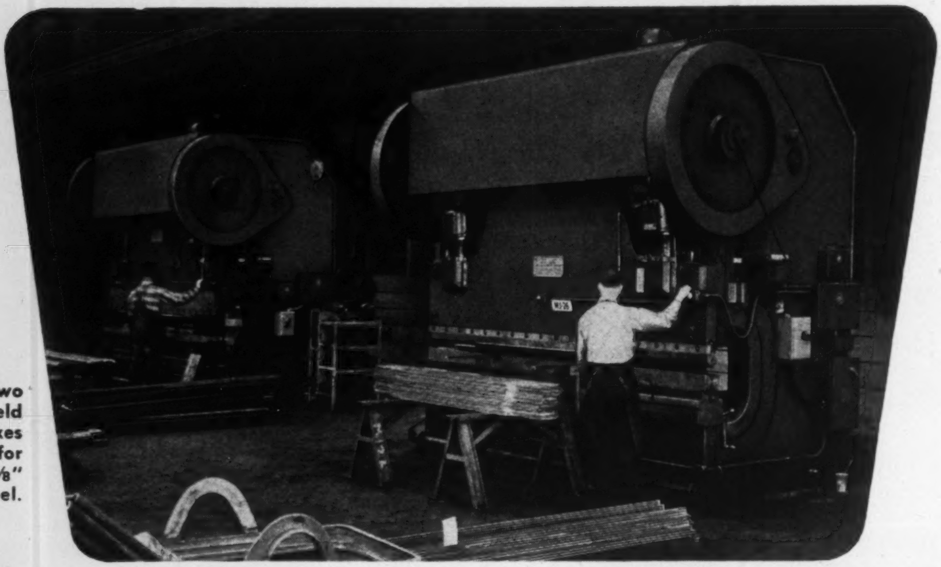
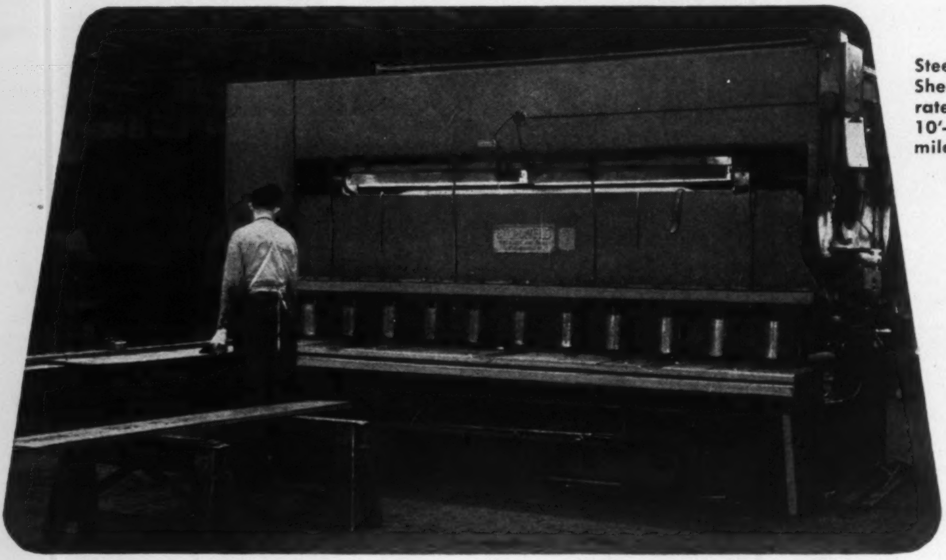


These two Steelweld Press Brakes rated for 12'-0" x 3/8" mild steel.

STEELWELD PRESSES and SHEARS aid Caterpillar Production



Steelweld Shear rated for 10'-0" x 1/2" mild steel.

Thousands of tons of steel of different thicknesses are sheared and formed on Steelweld Shears and Presses into various shapes required for the large volume of tractor equipment produced at the Joliet, Illinois, plant of Caterpillar Tractor Co. These items include scrapers, rippers, and bulldozer blades.

The heavy construction of Steelweld machines and many high quality features with which they are provided make possible continuous trouble-free performance. Their design includes a number of innovations which ease operation, speed production and enable accuracy to close tolerances.

The fact that Caterpillar has bought Steelweld Shears and Presses repeatedly and now has a large number of them is mute testimony to the satisfaction they are giving.

Free catalogs available.

STEELWELD

PRESSES and SHEARS

Steelweld Machinery includes: Mechanical & Hydraulic Shears and Press Brakes, One-, Two- and Four-Point Straight-Side Presses, Speed-Draw Presses.

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AN ALUMINUM ALLOY
FOR MALLEABLE CASTINGS
ADAPTALOY
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LEAD
FOR RADIATION SHIELDING
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ELECTROLYTIC COPPER
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casting alloy
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without hea
treatment
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INSTRUCTIONS
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An Asarco label on the material you buy is a pledge of quality, an assurance of highest performance in every application. It also means access to Asarco's vast knowledge of the material and how to use it for best results.

Aluminum alloys; antimony; arsenic; asbestos; babbitt metals; bismuth; brass ingot; bronze casting alloys; continuous-cast bronze rods, tubes, shapes; cadmium; copper; fluorspar; fusible alloys; gold; indium; lead; magnesium alloys; molybdenum concentrates; nickel alloys; nickel sulfate; platinum metals; selenium; solders; sulfur; tellurium; thallium; zinc; ultra high purity metals — this is the wide, unmatched range of Asarco's basic materials.

For detailed information on the specific material you are considering, write on your company letterhead to: American Smelting and Refining Company, 120 Broadway, New York 5, N. Y.

ASARCO

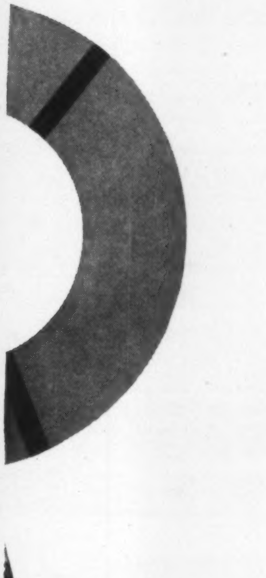
ACME STEEL MACHINES STRAP CIRCLES AROUND ANY OTHER METHOD

In the slit coil field alone, dozens of producers are proving that Acme Steel automatic strapping systems are the most productive partner slitting equipment ever had. For instance, the new F4 Strapping Machine and Indexing Table (at left) let one man completely strap as many as 150 coils *of any width* per hour—all through push-button control. And once secured, coils are unitized just as efficiently with Acme Steel portable powered strapping tools.

Thanks to this rapid, non-stop flow, existing slitting equipment can run *continuously* at full capacity, eliminating the need for investing in additional slitting lines in many instances. No wonder Acme Steel automatic strapping equipment can pay off in 18 months!

No field has a monopoly on these savings. Acme Steel equipment is scoring unparalleled productivity gains in strapping giant hot coils, paper, textiles, products and packages of every description . . . in bundling and unitizing such products as lumber, building materials, bar stock, pipe and sheet metals.

Full facts on industry's most proven and productive strapping systems are as close as your phone. Call your Acme Idea Man for an evaluation of your particular operation. Or, clip the coupon for case studies.



ACME STEEL IDEA LEADER IN **STRAPPING**

ACME STEEL COMPANY
Dept. IFS-91, 135th & Perry Ave.
Chicago 27, Ill.

Please send me detailed information illustrating how major companies in my field use Acme Steel Strapping.

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J. F. McINTYRE tells why CALMEC always looks to Lindberg for heat treating equipment

QUOTE
from
J. F. McIntyre

Left, S. E. Summers, Chief Design Engineer and at right, J. F. McIntyre, Executive Vice-President, Calmec Manufacturing Company, Los Angeles. In the Middle, J. E. Krickl, Western Sales Manager, Lindberg Engineering Company.

"When we have heat treating problems we like to get the Lindberg man right in the middle of them. We know Lindberg men are heat treating experts and the best source we have for advice on the most practical and efficient equipment to satisfy any heat treating requirement. As a result we've bought lots of Lindberg equipment in the past few years. We like it and the fact that we are continuing to buy it proves that the Lindberg man's advice has been sound."

Lindberg Carbonitriding Furnaces at Calmec Manufacturing Company, Los Angeles, Calif.

Mr. McIntyre has certainly backed up the above words with deeds. Over the past few years, Calmec, a leading manufacturer of precision tools, parts and missile system components, has installed twelve electrically heated furnaces, six gas-fired furnaces and four atmosphere generators—all Lindberg! And we hope there are more to come. If you have any product or process in the metal or ceramic field requiring the application of heat it would be a good idea to get the Lindberg man in the middle right away. You can depend on his experienced help and Lindberg's engineering and design know-how to provide exactly the right equipment for your need. It's easy! Just get in touch with your Lindberg Field Engineer (see your classified phone book) or write us direct. Lindberg Engineering Company, **2452** West Hubbard Street, Chicago 12, Illinois.

Los Angeles plant: 11937 S. Regentview Avenue, Downey, California. In Canada: Birlefco-Lindberg Ltd., 15 Pelham Ave., Toronto 9, Ont. Also, Lindberg plants in Argentina, Australia, England, France, Italy, Japan, South Africa, Spain, Switzerland and West Germany.

LINDBERG
heat for industry

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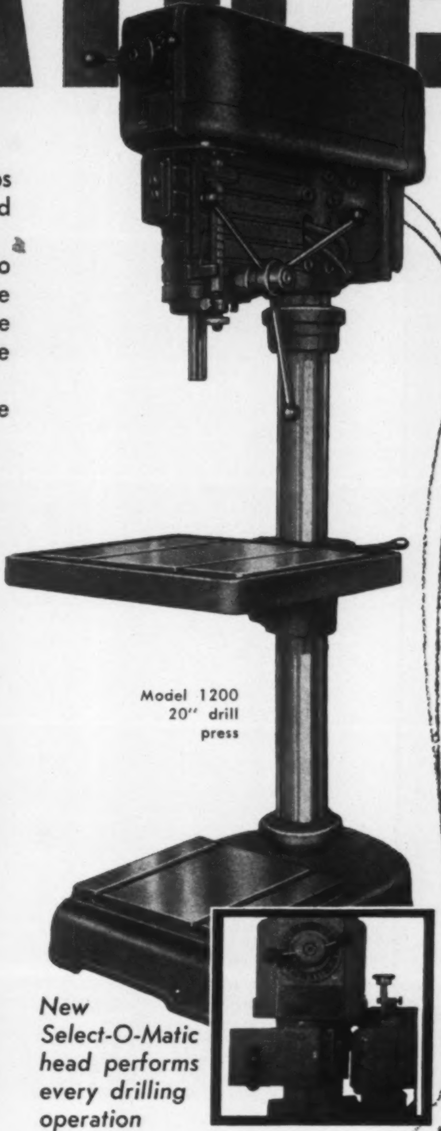
Here's the do-everything drill press that zips through any job . . . from reaming, spot-facing and tapping to polishing and high speed drilling.

Infinitely variable speed range is from 120 to 1750 RPM . . . utilizing a two-speed motor with the famous Powermatic variable speed drive. This same high-low speed system (160 to 2100 RPM) available on step-pulley model.

Equally safe, dependable and accurate in line production or in the smallest job shop.

- **Mechanical or Hand Feed Models**
- **Floor or Bench Units**
- **Multiple Spindle Arrangements**
- **Micrometer Depth Gauge**
- **6-spline Spindle**



Model 1200 20" drill press

New Select-O-Matic head performs every drilling operation

Model 87 20" Metal Cutting Band Saw

DIAL SPEED . . . CUT COSTS SAFELY!

Set speed from 40 to 4600 SFM while saw runs. Save stock change - over time. Ferrous and non-ferrous metals, wood, plastic and similar materials.

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Standard Forge & Axle Co. forges 5-inch by ½-inch Pittsburgh Seamless Mechanical Tube ends down to 2⅝" solid steel wheel spindle ends (cross section above). The Montgomery, Ala., plant then machines and grinds bearing surfaces to .0005-inch tolerance to produce single-piece, 20,000 pound capacity trailer axles. Trailer operators benefit from higher payloads because . . .

They Throw Away The Holes—And Save Weight

The trick in making a seamless steel tube is piercing a hole in a round of solid steel.

But Pittsburgh Steel Company's Seamless Steel Mechanical Tubing makes the full circle in production of trailer axles at Standard Forge & Axle Co., Montgomery, Ala.

Standard, in effect, throws away the holes by forging the tube ends down to solid steel again, leaving only a hollow steel center and spindle section.

The result: a lightweight, one-piece trailer axle made entirely from a single length of seamless tube—including load bearing wheel spindles, precision ground for bearing and seal seats.

The advantage: assured strength and safety of seamless steel, plus, for example, reduced axle weight for trailer operators in a 20,000 pound capacity axle.

Starting with a seamless steel tube 5" x ½" x 87⅞" for this particular axle, Standard upsets both ends, then swages them down to the shape of a spindle with a 2⅝" solid end.

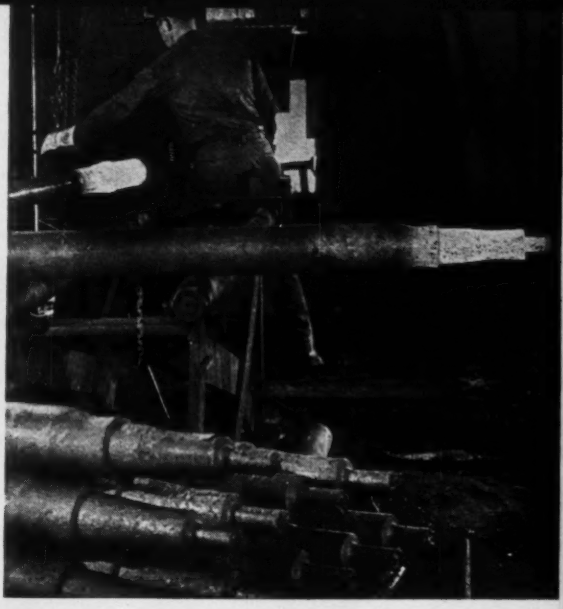
That's deformation of the roughest kind.

But Pittsburgh Seamless Mechanical Tubing takes it in stride, then bounces back under heat treatment with the physical properties required for precision finishing of the critical spindle surfaces, and the toughness necessary for a long life in hard service.

And that kind of performance takes seamless steel tubes with exceptional internal soundness, consistent grain structure, and chemical and dimensional uniformity.

Pittsburgh C-1040 grade Seamless Mechanical Tubing supplies these properties consistently—for this type

After upset, Pittsburgh Seamless Mechanical Tubes, with 5-inch OD and ½-inch wall, are swaged to solid steel spindle shape on drop forge, at right. Standard's heat treating process refines grain, restores toughness of steel.



20
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Standard also produces high-strength inserted spindle trailer axle by inserting forged alloy steel spindle with 4.065-inch OD into 4.040-inch burnished ID of 5-inch seamless steel tube under 50,000-pounds pressure.

Standard Forge & Axle Sales Manager James A. Rumbley says Pittsburgh Steel Company, as longtime major supplier of seamless mechanical tubes, "leaves nothing to be desired in product or service."

axle and for Standard's high-strength inserted spindle type.

James A. Rumbley, Standard's sales manager, says:

"Trailer axles are high-weight carrying members subject to tremendous load shocks. So we use the finest materials available to assure our customers trouble-free service. Seamless steel mechanical tubes help us to do that, with complete safety and at less weight.

"For many years, Pittsburgh Steel Company has been one of our major tubing suppliers. It has left nothing to be desired either in product or service."

That's standard practice with Pittsburgh Steel—whether supplying seamless mechanical tubing to Standard's specific requirements, or to yours. Be certain with Pittsburgh Seamless. Contact one of the district offices listed below.

Pittsburgh Steel Company

Grant Building • Pittsburgh 30, Pa.

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AKRON, NEW YORK

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STRIPPIT Hydra Springs, using compressible liquids, develop up to 600% more force than mechanical springs of comparable size. Six standard models develop forces from 2,200 lbs. to 8,500 lbs. and operate with strokes ranging from ¼" to 1½". Spring rates run from 2,200 lbs. to 32,000 lbs./in.

STRIPPIT Hydra Springs use STRIPPIT Comproils. Changes in the type or volume of Comproils vary and adjust the loads of the Hydra Springs to meet required forces of individual applications. In addition, a force adjuster for critical pressure adjustments is provided on all Hydra Springs except Model 38K11.

STRIPPIT Hydra Springs' high spring force, instant action and compact size make them ideal components in many installations where space is at a premium. Typical applications include uses with dies, perforating equipment, machine tools and plastic injection dies, cable tensioning devices, retarding mechanisms.

STRIPPIT Hydra Spring applications are so varied that, in addition to the standard models, STRIPPIT's engineers can custom design and fabricate special Hydra Springs to solve your problem. A call to your STRIPPIT Tool & Methods Engineer will bring immediate help. If you prefer, write for Catalog K.

WALES STRIPPIT INC.

202 Buell Road ◆ Akron, New York

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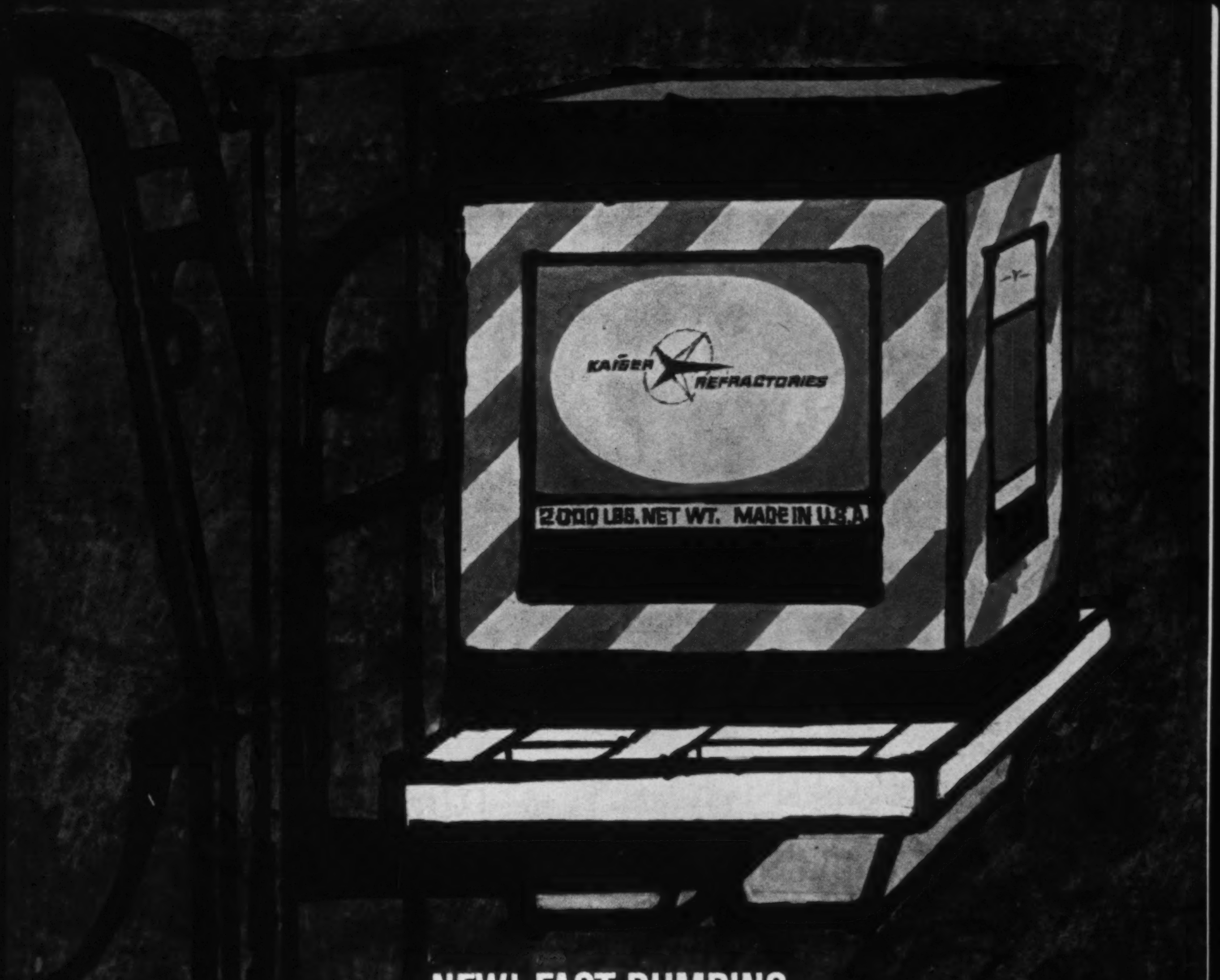
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. . . delivers one ton of Kaiser ramming mix or gunning grains as fast as you can pull two tabs! Kaiser-Pak is Kaiser Refractories' new palletized, moisture-proof carton. Pull one rip tab at its bottom—and a half-ton of material pours neatly between the forks of your lift. Pull the other and you've dumped a measured ton. Time: about one minute.

Each Kaiser-Pak eliminates lifting, ripping, dumping 33 sixty-pound or 20 hundred-pound sacks!

For more information about this new contribution to customer service, ask your Kaiser Refractories Sales Engineer—or write Kaiser Refractories:

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KAISER REFRACTORIES

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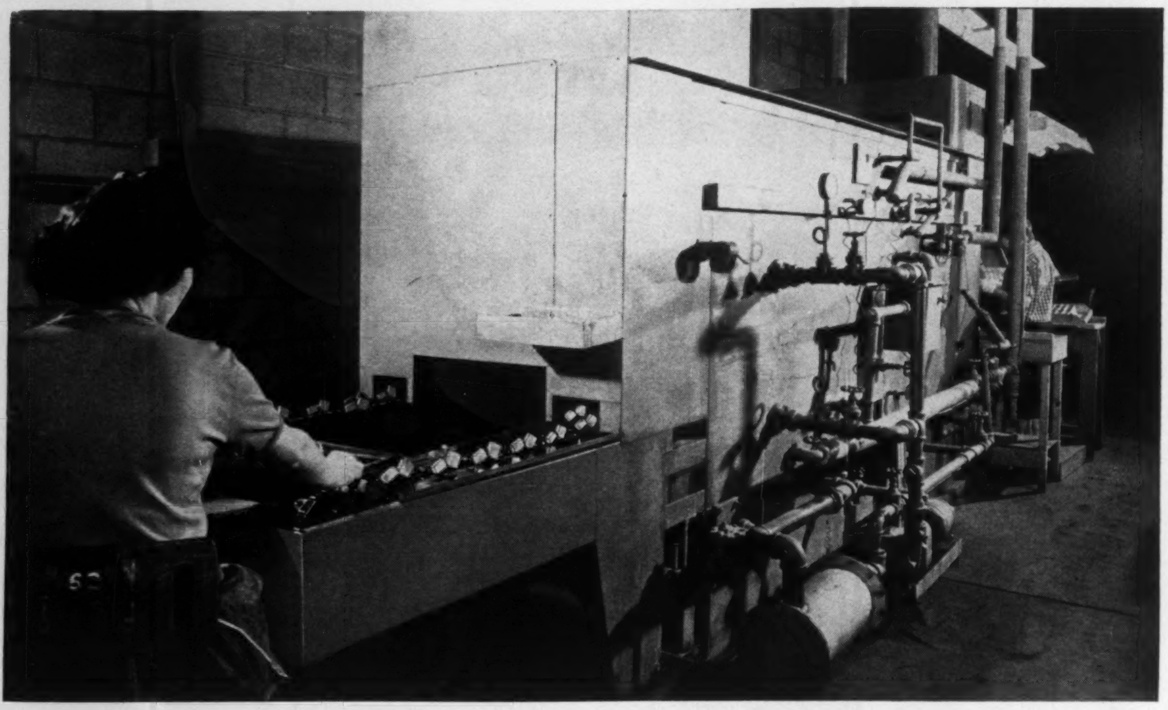

HOW ZIPPO DEGREASES 100,000 PARTS BEFORE CLEANOUT

Zippo Manufacturing Company, Bradford, Pa., is meticulous about degreasing parts and cases used in their lighters. The company does as careful a cleaning job as watchmakers or manufacturers of aircraft instruments.

With all their attention to detail, they still manage to degrease 100,000 parts before cleanout with Nialk® TRICHLORETHYLENE. The special stabilizer contains *psp*—permanent staying power. This permits them to process a large volume of parts without endangering their quality. *Psp* maintains the stabilizer at maximum efficiency between cleanouts.

The stabilizer also prevents gummy substances from forming, substances which might coat the heating elements in the degreaser units and reduce efficiency of the operation. The vapor and bath stay clean. Parts never become tarnished.

When baths are cleaned out, Zippo gets full recovery of the solvent, and it is fully stabilized so they never have the cost and trouble of adding fresh stabilizer to maintain bath strength.

Zippo likes the several different degreasing jobs that Nialk TRICHLOR does. As many as five different metals might be degreased in a day—brass, stainless steel, die-cast zinc, copper and gold.

Even considering all the use Zippo gets from each bath, they have never had to sacrifice quality. There has never been a need to titrate or run any other type of test.

Nialk TRICHLOR can bring you the same benefits and cost savings. Hooker technical experts can help you to set up your degreasing operations, then check regularly to make sure your operation remains trouble-free. Zippo obtains Nialk TRICHLOR through Ken C. Merrill Co.

See *your* Hooker Chemical distributor. He will be glad to help you with your problems and questions. Or write us direct. Our years of experience are yours for the asking.

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Today's machine tools can't afford motors selected on the basis of price alone

Modern machine tools are designed to manufacture products of great precision at the lowest possible cost. But a machine tool is only as productive as the electric motors that drive it. Motors purchased on the basis of price alone often fail to give their users the greatest value in terms of useful service life.

The selection of the right motor to power your products requires not only specification of type, rating and operating characteristics, but consideration of such factors as uniform, troublefree performance, dependable long-life operation, the reputation of the manufacturer, and his ability to provide immediate repair parts and service—when and where they're needed. Wagner® motors have earned their reputation for proven dependability in their specific applications.

Next time you buy motors, check beyond the purchase price. Make sure that you get all the performance you need—with motors that will do the job.

Wagner motors have been getting the job done for more than 65 years. Your Wagner Sales Engineer will be glad to show you why. Call him for an analysis of your next motor application, be it for plant or product.

Wagner Electric Corporation

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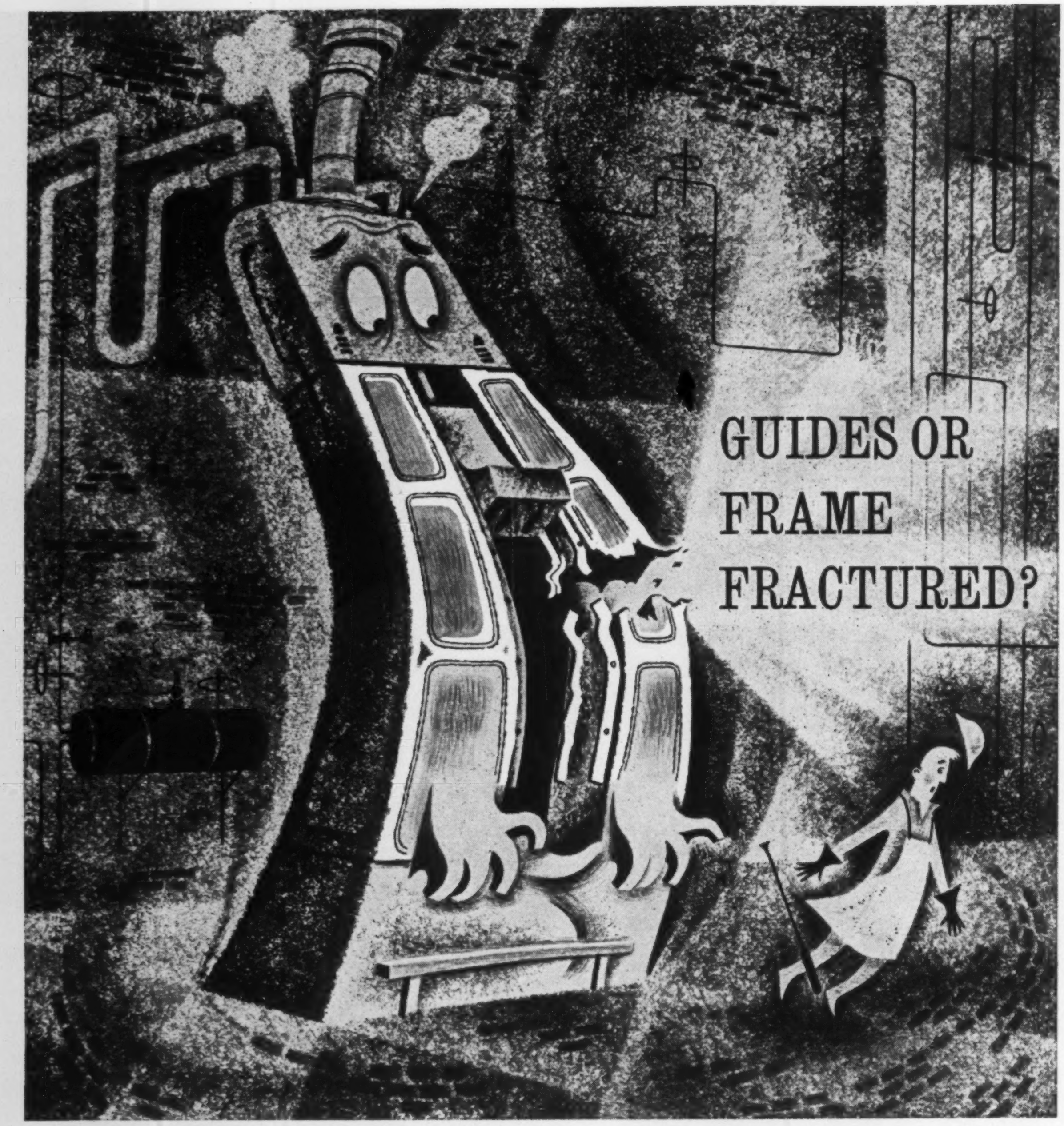
Manufacturers of LOCKHEED® Products

WM61-4



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Replacement guides, frames, and other parts for a wide variety of forging hammers of most any make are available from ERIE. They are high in quality, competitive in price.

For over 65 years we have specialized in the design, development and manufacture of forging hammers of all types. Logically, then, Erie Foundry is a natural source for repair parts equal in quality and performance to the original equipment. Substantial inventories assure you of prompt service. For more information on repair parts or our complete Hammer Rebuilding Service, write Mr. James Walker.

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Continuous-Cast Brass . . . a Scovill innovation now proven over 20 years . . . is different and very much better than ordinary brass because it starts with a different and better concept.

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Why not let us help you bring these outstanding advantages to the betterment of your product . . . perhaps at a cost that will show economies over your present materials and methods. Especially if you are planning new products, Scovill Technical Service offers practical help in selecting materials for utmost cost-efficiency.

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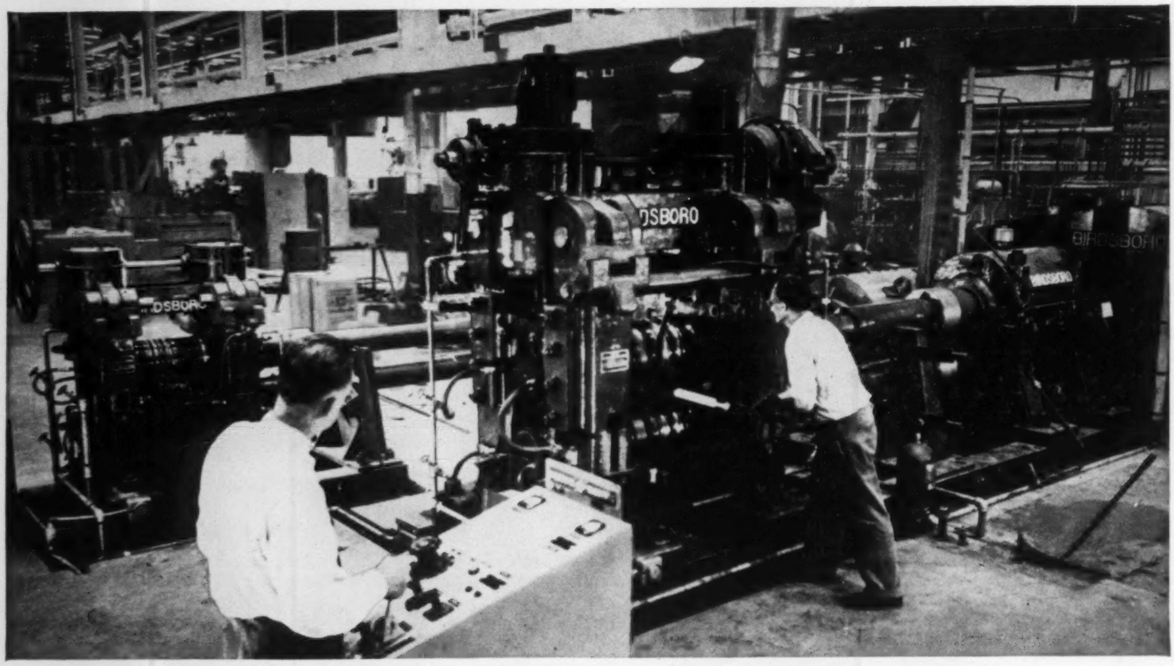
11SC61

New metals limber up for General Electric in BIRDSBORO experimental mill



To a manufacturer, today's miracle metals can be a dream come true . . . or a nightmare. General Electric finds out which—in advance—in this experimental laboratory. Here, scientists check out the unknown factors of these new metals by experimentation.

A laboratory feature is a Birdsboro 16"-10" bar mill. Custom designed to General Electric's specific requirements, it will help them explore new areas . . . and open new fields . . . in metals production. The Birdsboro men who designed and made this equipment are ready and willing to help you on your next mill machinery job. *Sales Department, Engineering Department and Mfg. Plant:* Birdsboro, Pa., *District Office:* Pittsburgh, Pa.

MM91-60

BIRDSBORO
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Quality . . . the best economy of all

Another product of Sunoco research . . . a fire-resistant hydraulic fluid

The flame test, above, dramatizes the effectiveness of Sun's new fire-resistant hydraulic fluid. The wick in the conventional fluid burns readily; the wick in Sun's new fluid just can't be lighted.

SUNSAFE, a water-in-oil emulsion, eliminates fire hazards . . . provides increased safety to personnel and equipment. At the same time, operators get the essential performance characteristics of a top-grade hydraulic oil—low rates of wear, long service life, and protection against rust and corrosion.

This combination of *quality* in engineering know-how, and *quality* in product, proves once again that *quality* in any sense is the best economy of all.

For 73 years Sunoco has meant quality right down the line. Today, this quality is found in more than 400 Sunoco industrial products. SUN OIL COMPANY, Phila. 3, Pa., Dept. I-14. In Canada: Sun Oil Company Limited, Toronto and Montreal.

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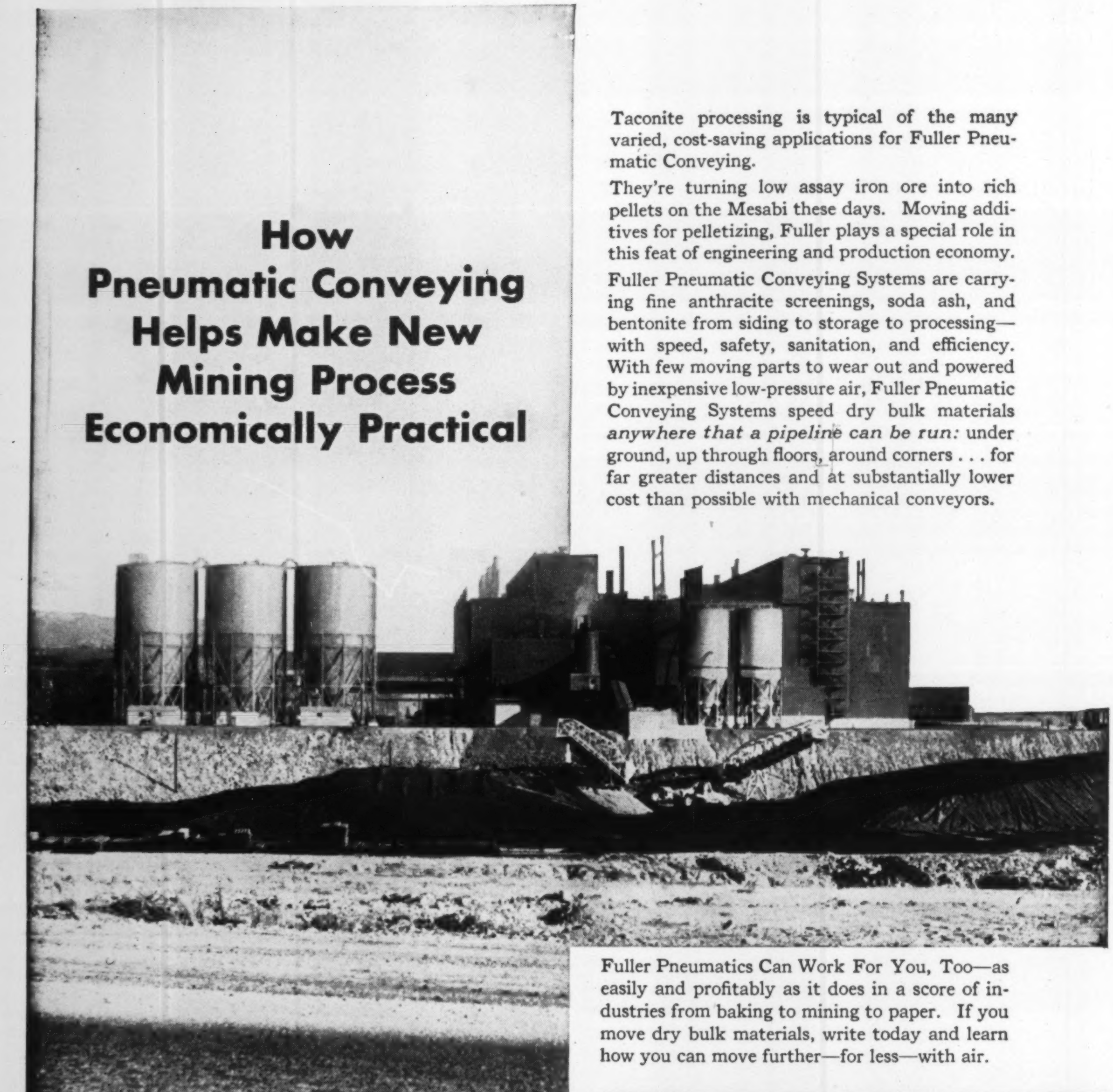
How Pneumatic Conveying Helps Make New Mining Process Economically Practical

Taconite processing is typical of the many varied, cost-saving applications for Fuller Pneumatic Conveying.

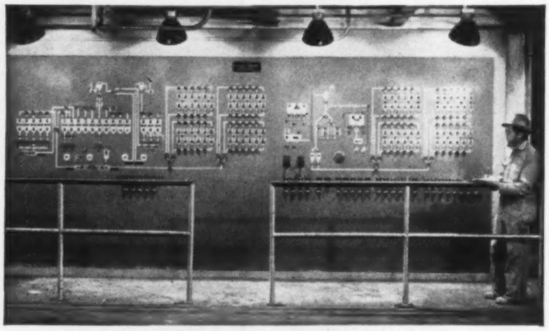
They're turning low assay iron ore into rich pellets on the Mesabi these days. Moving additives for pelletizing, Fuller plays a special role in this feat of engineering and production economy.

Fuller Pneumatic Conveying Systems are carrying fine anthracite screenings, soda ash, and bentonite from siding to storage to processing—with speed, safety, sanitation, and efficiency. With few moving parts to wear out and powered by inexpensive low-pressure air, Fuller Pneumatic Conveying Systems speed dry bulk materials *anywhere that a pipeline can be run:* under ground, up through floors, around corners . . . for far greater distances and at substantially lower cost than possible with mechanical conveyors.



Four Fuller Pneumatic Systems can speed more than 307 long *tons* of additives through this huge Taconite Pelletizing Plant in a single day.

Fuller Pneumatics Can Work For You, Too—as easily and profitably as it does in a score of industries from baking to mining to paper. If you move dry bulk materials, write today and learn how you can move further—for less—with air.



Centralized control is provided by giant panel designed and manufactured by Fuller.

See Chemical Engineering Catalog for further details and specifications

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when you need it!

We can produce
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to your exact specifications and
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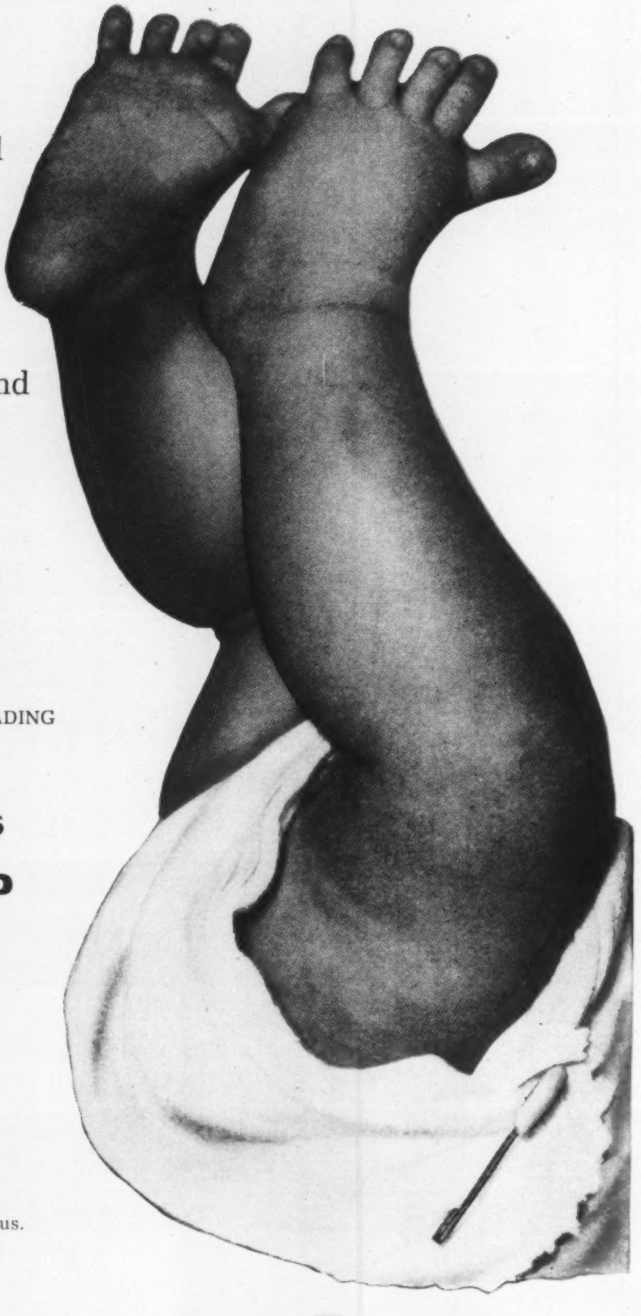

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and personal service that can
come only from an
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ROLLED NICKEL ANODES ... call us.
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SALES OFFICES: BUFFALO • NEW YORK CITY • CLEVELAND • DETROIT

CAN WAR BE AVOIDED between the salesman and the purchasing agent? It isn't easy, and maybe not altogether desirable. Here are some comments on the basic issue between the P.A. and the salesman drawn from last week's meeting of industrial distributors. Said a top P.A.: About 5 to 10 pct of salesmen calling are crackerjacks; about 15 to 20 pct are good, average salesmen; there are practically no creative salesmen. Rebuttal from a recognized salesman: "It is impossible to do any creative selling when the buyer is signing letters and answering the the telephone. Furthermore, he won't even let you in to see anyone in the shop."

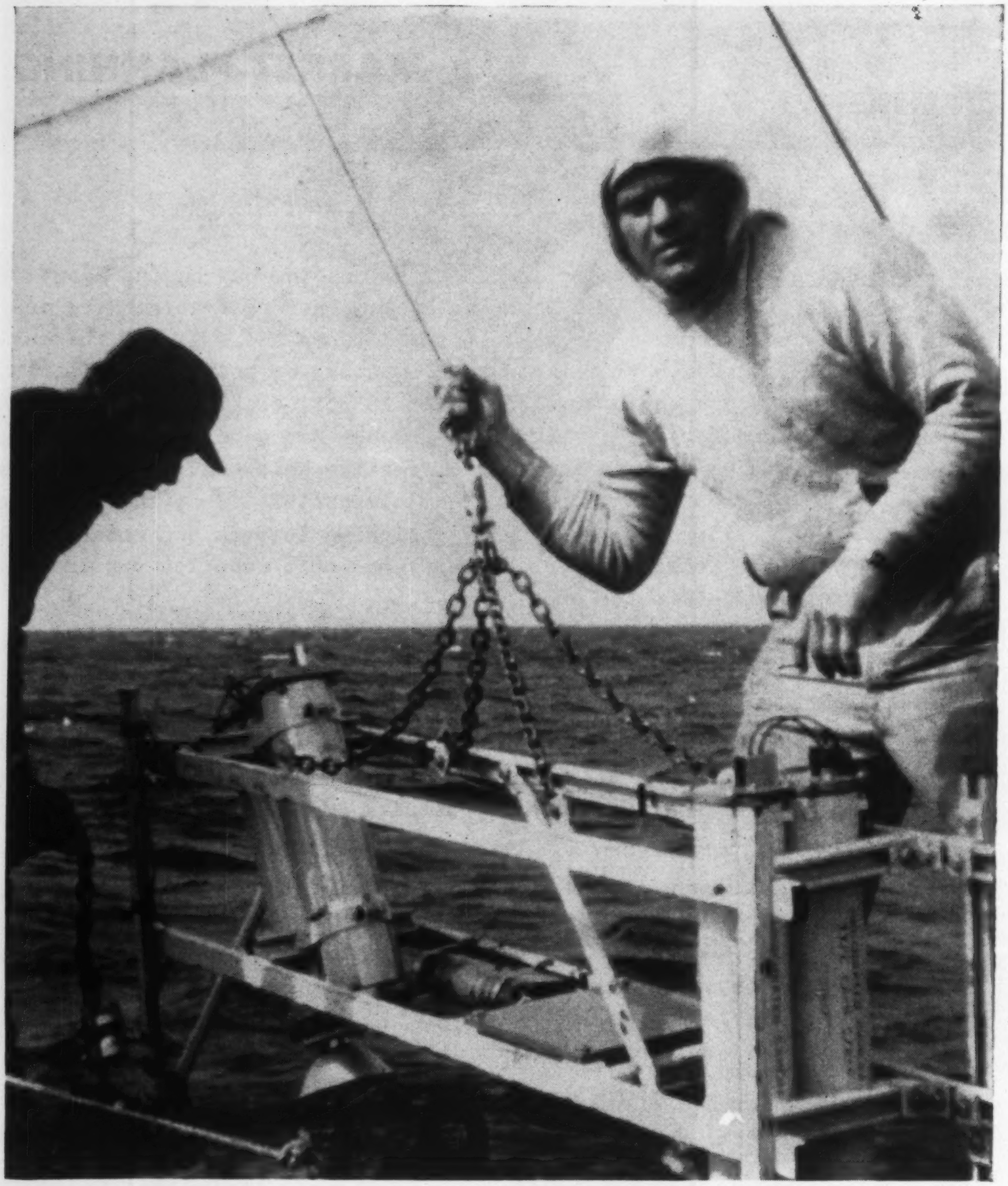
ON THE SUBJECT OF DISTRIBUTORS, some of them believe they are having a population explosion that spells disaster. There are now about 4300 of them in the U. S. "This," says W. E. Walters of East Carolina Supply Co., "has brought profitless prosperity. You spend five years training a man and then he goes into business for himself." Result: Cut-throat competition.

BIG SPENDING IS PLANNED by private utilities in the U. S. According to Cleveland Illuminating's E. C. Lindseth, private utilities are planning to spend $8 billion by 1970 on a nationwide network of high-voltage transmission lines to connect the entire country. Equipment for such a program involves high-voltage cable, transmission towers, plus control, switchgear, and transformer equipment.

A SALES IMPROVEMENT HAS NOT eliminated price problems of stainless steel producers. Last week a leading mill cut the price of type 304 by 3.5 cents per lb. Prices of warehouse sheet are reported more stable, but at levels that are called impossible. One producer is telling its customers they can do better by buying stainless sheets from distributors.

ON CAPITAL EQUIPMENT'S FUTURE, Warner & Swasey's L. M. Cole tells the industry to look to the service and nondurables industries as future markets for tools and machinery. He told an NICB forum in New York this week: "The demand for consumer products will create a change in capital goods demand. A growing share of the consumer dollar will be spent for services and a smaller share for goods. The wise producer of capital equipment would do well to study the effect."

READY TO MOVE UP IS aluminized steel from specialty to tonnage product. Says Armco's L. T. Johnston, "Mark my words, this is going to become a major product."



How to take a picture seven miles deep

These men are raising from the ocean bottom an underwater camera made by Edgerton, Germeshausen and Grier, Inc. Actually this plunge was only a shallow dip of one mile. The camera is fully capable of exploring and photographing the Marianas Trench, the deepest known spot in the ocean. The camera has been tested for depths of 48,000 feet with forces of 11 tons per square inch.

To specify steel that would protect the vital elements of the camera against pressure like this, the designers consulted metallurgists of The Timken Roller Bearing Company. In addition to withstanding terrific pressure, the steel had to be easy to machine to permit the tolerances and finish required for effective sealing. After study, Timken® 52100 seamless steel tubing was recommended—a high-carbon, low-chromium alloy steel frequently used in anti-friction bearing races. Under test, this tubing showed it could take any pressure the camera might face in the deepest oceans.

Timken Company metallurgists are old hands at finding steels that do the job with a minimum of expense and production problems. They've been solving tough steel problems for industry for over 45 years. The Timken Roller Bearing Company, Steel and Tube Division, Canton 6, Ohio. Cable address: "TIMROSCO". Makers of Tapered Roller Bearings, Fine Alloy Steel and Removable Rock Bits.

TIMKEN®
FINE ALLOY STEEL

Auto Terms, President's Action Spell Trouble in Steel Labor

The outlook for steel labor peace in 1962 never was too good. Now, it's more discouraging.

Steel industry is faced with a fat auto contract to compete with, plus strong White House pressure.

By Tom Campbell

▪ The earmarks of next year's steel labor hassle are showing. And they indicate tension, trouble, and an attempt at wheeling and dealing.

It used to be a proper rejoinder—for others—to say September is too early to talk about what might happen in a labor situation the following July. Not so now.

The signs are multiplying that the President has set up so many factors which can be misconstrued by both sides that a major and bitter argument over steel negotiations is a foregone conclusion.

On Productivity—On the matter of productivity alone, days and days of fruitless arguing are a certainty. Mr. Kennedy, in his letter to Dave McDonald, Steelworker chief, has suggested next year's demands be held to productivity gains and also within the area of price stability.

The USWA will argue that productivity gains are and will be large enough to take care of any demands it might make. And, in the interim, there will be the usual argument about the "creep"—the difference between what labor says it got and the amount management says costs were increased.

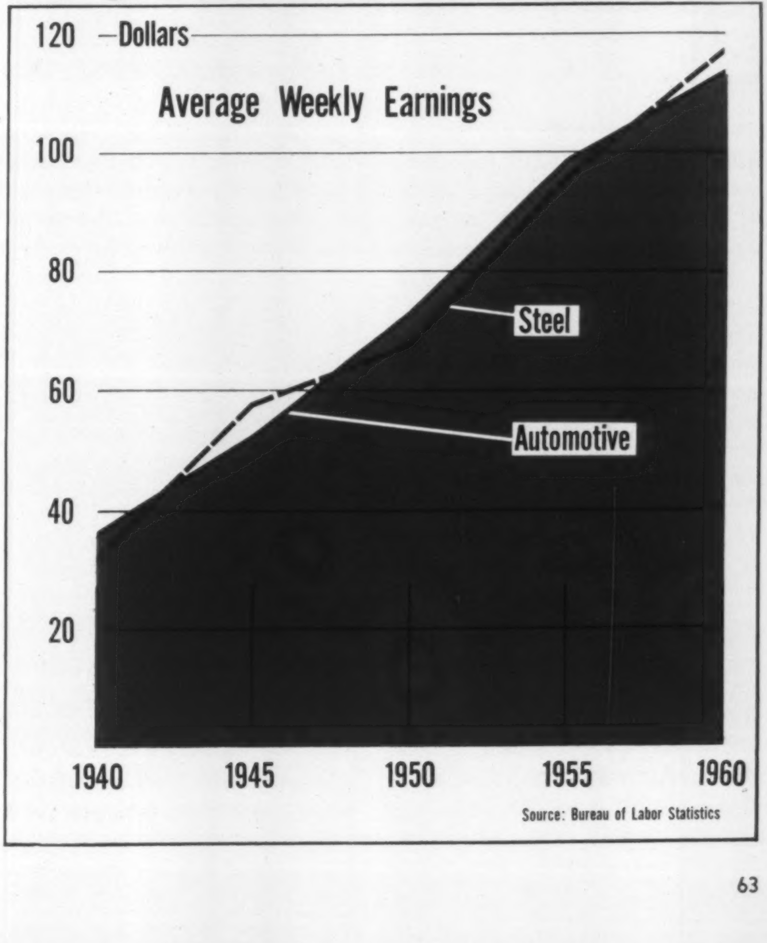
A Lot to Absorb—Then there will be the argument by the steelworkers that steel will be able to absorb its wage increases without price hikes.

Most of the letters from top steel people in answering Mr. Kennedy — except one — indicated the industry could not go on forever taking wage advances and holding prices. The idea here is plain—to continue to absorb price cost increases without corresponding help from higher prices would mean eventually there would be a weak industry, a losing industry, and an industry which would not be carrying out its responsibilities to its country, its employees, and its owners the stockholders (see p. 65).

Bad News from Detroit—The most recent factor, though, which will make next year's steel negotiations a vicious session, comes from Detroit. Among all the stories over the lack of time for workers to "relieve" themselves is the foot-in-the-door for a modified annual wage.

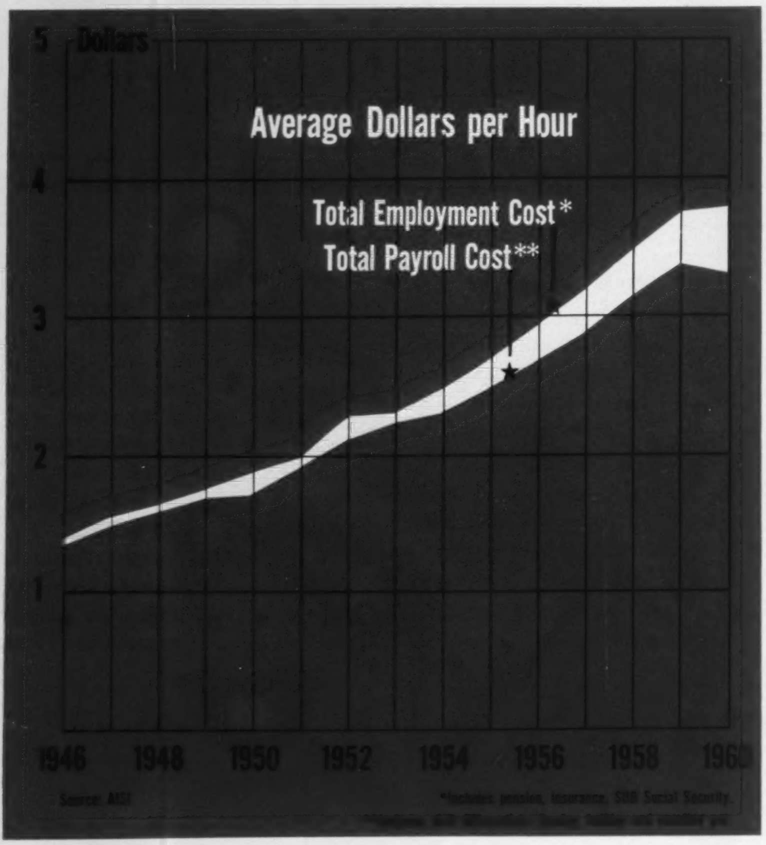
Here are shadows from the late USWA president, Phillip Murray. Mr. Murray had hoped that in his lifetime he would see an annual wage for steelworkers. In 1959,

Wages: Who's Ahead Now?



Source: Bureau of Labor Statistics

Pay Envelope Doesn't Tell All



Source: AISI

*Includes pension, insurance, SUB Social Security.

when the steel strike was at its worst, The IRON AGE was convinced that the next big drive would be for an annual salary for the blue collar workers.

Now that has come in the auto industry in a combination of half-time paid hours less than 40 not worked in any week. Also, when the smoke clears, it will be seen that the Supplemental Unemployment Benefits (SUB) are now heading toward the 100 pct mark. In the auto settlement, they appear to be close to 75 pct. While all this is not an annual wage, it is one-and-a-half feet in the door.

Price Outlook — Historically, what Reuther gets, McDonald tries to better. What McDonald gets Reuther tries to better. The chart shows the ups and downs in this personnal competition. To say they don't compete is for the birds.

There is little chance of a steel price raise this time. Even if it comes, it will be as The IRON AGE has indicated—a small raise and one which will hit only a few items. Talk now of no across-the-board steel hike is merely setting up a straw man. There hasn't been a ghost of a chance for an across-the-board steel price hike since the steel companies missed the market boat in February, 1960.

Goldberg's Role—If there is no steel price hike, or even if there is a small one, it will make the job of Dave McDonald that much more rugged. It will be well-nigh impossible for him under those circumstances to wring much, if anything, out of the steel companies. And that was the case long before the indefinite statement from the President suggesting labor hold the line.

Chances that there may be an attempt at a deal next year stem from the hard fact that both the President and Secretary of Labor Arthur Goldberg are old hands at working out the ultimate goal of both sides.

Writing the Book—Here is the way we see the Steel Follies of 1962 building up:

. . . Script at White House level not written yet, but trial run was made at Detroit. Lessons learned there will be used next July when steel reaches an impasse.

. . . Labor script is already written. It is the same. Big deal with demands from the locals before negotiations start. A strong buildup in the papers, speeches, arguments. Softening of anything that smacks of a commitment—like the letter Dave McDonald sent to the President. That missive backfired. It said nothing, but the President used it as a means of suggesting that Dave take it easy next year.

. . . Script from the steel side already written. Most will be a repeat of all the recent speeches of R. Conrad Cooper, chief steel negotiator and U. S. Steel executive vice president. Included will be new and sharp text taken from Roger Blough's letter on prices to the President. The script will be harder, tougher, and will have no loopholes. It will come close to a "no."

. . . Down to the line the argument will rage. Steel ordering will step up with the steel rate at 80 pct or more for the first half of next year. At the wire—June 30— there will probably be one postponement —only one. Then the strike!

. . . Then the team of Kennedy and Goldberg moves in. A war and controls would change all this. But if no war, the tack taken will be the same as in autos, but with more urgency, brass knuckles and eventually a call to the White House, if necessary—to an angry and frustrated President calling in Taft-Hartley long before it came in 1959.

Make no mistake about it: Next year could see a long, bitter strike because the steel companies are backed up against the wall on labor costs vs. what they can get for their steel. Entrance of the government only makes matters worse.

Steel Cool to Price Freeze Plan

■ Steel industry leaders, replying to President Kennedy's request for a price freeze this fall, met the issue head-on, disagreed with many of his conclusions, and would not guarantee to hold present price lines.

While replies from the top steel companies differed in tone, most stressed these major points:

Steel pricing depends on market conditions, with competition and profit margins deciding when adjustments are necessary.

While basic to the economy, steel is not a bellwether industry with a major influence on prices.

Without adequate profit margins steel cannot finance the capital improvements vital to the industry, the economy, and the nation.

Administration figures overstate the industry's profit position, base estimates of steel profit levels on short-term predictions of output.

Moves for a steel price freeze are a major step toward governmental price fixing.

Rejected the idea that the steel union will use moderation in its wage demands during contract talks next summer.

Costs, Prices and Profits—Why the industry cannot give assurance prices will not be raised was well summed up by Thomas F. Patton, president of Republic Steel Corp. "We frankly do not know whether, or to what extent, or when, Republic may adjust its prices because we cannot predict or control the vigorous competition which requires us to adapt to prevailing market conditions."

He added, "Despite technological improvements, extremely tight cost controls instituted by management, and changes in output per manhour . . . our profits have been squeezed severely by the narrowing margin between costs and keenly competitive prices. . . ."

The sharpest attack on the government's methods of estimating steel's economic position was made by Avery C. Adams, chairman of the board of Jones & Laughlin Steel Corp.

"Grossly Unfair"—"In your letter, Mr. President, you used 'from the beginning of 1947 to the end of 1958' as a period when 'steel mill product prices rose 120 pct and 'steel wage rates also rose rapidly causing employment costs per ton of steel to rise by about 85 pct.'

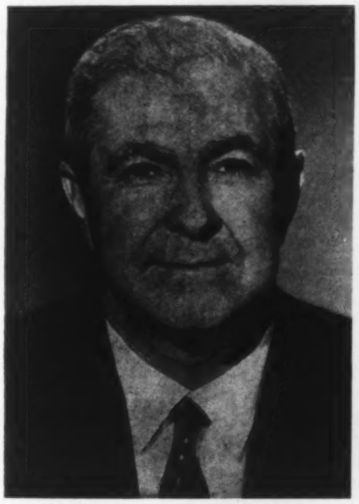
"Use of 'beginning of 1947' as a base for measurement . . . paints an entirely erroneous picture of steel's economics, and is grossly unfair to the industry."

"From 1940 through 1946, steel prices (as measured by the Bureau of Labor Statistics) and total employment costs (as reported by the American Iron and Steel Institute) increased 12 pct and 55 pct, respectively. As a result of this wage-price squeeze, the steel industry's return on investment dropped substantially. At the same time, its position, as reported by the First National City Bank, dropped from 29th place to 41st place in 45 major manufacturing industries. Obviously, the 'beginning of 1947' as a base is totally unrealistic."

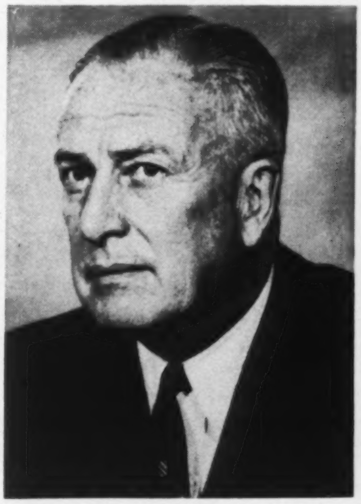
Union Restraint? — Roger M. Blough, chairman of the board, U. S. Steel Corp., rejected the idea that the Steelworkers will use restraint in its wage demands when new contracts are negotiated next year.

"I must note that during the past few months there have been a number of wage settlements which by no stretch of the imagination can be considered to be non-inflationary. In spite of your own commendable concern regarding the inflationary effect of wage movements, there seems to have been—in this period —a noticeable absence of any observable restraint by unions in their demands."

Besides those mentioned, replies from Bethlehem Steel Co., Youngstown Sheet & Tube Co., and Armco Steel Corp. and several other of the twelve steelmakers have been received by the White House.



THOMAS F. PATTON: "We vigorously disagree with the way data has been compiled and interpreted."



AVERY C. ADAMS: "The prime source of inflation lies in the fiscal policies of the government."

Fasteners Call Business Turn

Autos, Defense Will Pace Uptrend Into Next Year

The industrial fastener industry continues in its role as a leading business indicator.

Sales and shipments have moved up sharply in the past few months. Steady gains are expected.

By T. M. Rohan

- Things are beginning to look real good in the fastener industry.

This industry's traditional role as a front-running business indicator is solid as ever based on new sales and shipment reports. Some industry leaders have had up to 25 pct improvement in orders since June. They expect a continuing improvement well into next year. And if steel prices go up, fasteners will not be far behind.

"Shipments for May, June, and July this year saw an increase each month in our index and we anticipate a continued gain for August," says Frank Masterson, president of Industrial Fasteners Institute, Cleveland.

Good Customers—"In the first six months, imports of fasteners were down 40 pct in dollar value from the same period in 1960. The upturn now is possibly due to increasing business activity throughout the world which is soaking up foreign production at home. There is also an increasing resistance by U. S. companies to buying imports," he added.

Defense and automotive demand are also behind the new push.

"The final factors for a strong 1961 are autos and the build-up of U. S. defense," Mr. Masterson says. "Reactivating planes, ships and other material requires more bolts, nuts, rivets and screws for maintenance and original equipment. Autos, too, are the biggest users of mechanical fasteners. A fast start on new models would spur the industry."

Apparently little of the increase is due to price hedge buying based on a possible steel price increase. But if a steel increase does materialize, it probably would be passed on by fastener makers after a month or so.

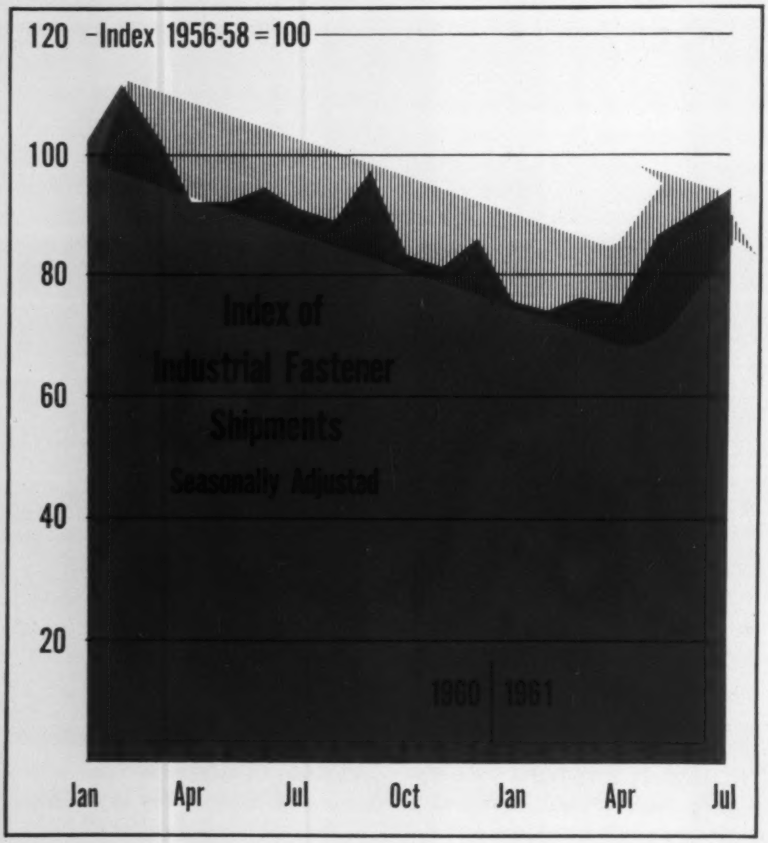
Looks Even Better—"Our industry had an increase of 4.7 pct in the price of bolts in August, which was announced about a month in advance. Even this didn't spring any orders loose, so we feel there's no hedge buying in the upswing, now," says J. S. Davey, sales vice president of Russell, Burdsall & Ward Bolt and Nut Co.

"We are figuring September shipments will be about 10 pct over August and the increases should continue right through next year," he said. "But there's just about no backlog; we're shipping standard sizes from stock and there is little forward ordering by customers," he says.

Price Outlook—If steel prices go up, fasteners would probably go up soon after.

"Our industry is just about at the break-even point now and we would have to pass on any increase in steel prices," says Mr. Davey. "Steel is about 40 pct of our cost and we can't absorb any more increase there."

Shipments Turn the Corner



Changes Ahead for Heavy Vehicles

Design Savings

Product design is moving strongly into areas where appearance had been regarded as secondary. New design, essentially a "face-lifting" on a piece of self-propelled farm equipment, is largely credited with producing a 25 pct sales gain for that product in a year when most equipment lines barely held even.

New Products

Production people have been complaining that product designers are not keeping them in mind when creating a new product. Watch for some fire from the other direction. One report indicates over 75 pct of all changes made in a test case were caused by designers having to modify their ideas to conform with the production department. They say production is just dragging its feet.

Aluminum Ore Cars

Despite higher initial cost, the aluminum off-highway truck body for ore hauling is performing well. Reduction in truck weight of 7-12,000 lb enables operator to recover higher initial outlay in as little as 4.5 months. Heil Co., Milwaukee, has built 18 for Alcoa. At least seven have been sold.

Military Standards

New military engine designs represent a major step forward in standardization. From 78 engines with ½ to 20 hp output, requiring 23,000 parts, Army has gone to six models requiring 800 different parts.

Horsepower Shift

Europe, like the U. S., is becoming horsepower conscious. This is particularly noticeable in the light diesel field. The diesel is pre-empting the 5 hp and up range, with gasoline doing its best in power lawnmower and chain saw use.

Production Control Stepped Up

Heavy vehicle builders took a sharp look at production control—its past performance, current progress and potential.

SAE sponsored the sessions, first for five major groups.

By K. W. Bennett

■ Society of Automotive Engineers held its first joint meeting in Milwaukee last week of the five major groups that build heavy vehicles. It turned up much fact, and some hard-hitting appraisal of production control.

"Compatible tape control," output and input systems that will settle standard systems of presenting data, will be in the final stages within six months, according to engineers at the meeting.

Work by control manufacturers and the Electrical Industries Assn. should be complete then. A high density, half-inch tape is now about two years away. Less complex tapes will be available next year.

Financial Fire—The economics of tape controlled machines again drew fire. But a government arsenal, described by its chief as "one of the biggest job shops in the nation," has placed orders for seven new tape-controlled machines.

In all cases, the outlay was justified by reduced machining costs from equipment already installed. One machining job, through tape control, was cut from 9 to 2.5 hours.

A tip from one machine tool manufacturer: There are enough possible uses for it to indicate that tape controlled automatic welders, particularly the carbon dioxide shielded type, could make quite a splash in the market.

Aluminum Castings—Auto industry engine requirements are boosting cast aluminum specs. A diesel impeller is cast that, with 8 pct elongation, gives actual strengths of 36,000 psi yield, 50,000 psi tensile, according to A. H. Hinton, Aluminum Company of America.

Carbon dioxide cores give prototype castings the characteristics of permanent mold castings. This will mean a speedup in design testing.

Heat Treat—In a lively heat treat session, Kolene Corp.'s Tufftride, now in its second year, drew much interest. G. S. Bidegar, director of research for Commercial Steel Treating Corp., reports: "I'll probably be accused of going overboard on this; but we've obtained a 0.040 case in 90 minutes with Tufftride."

X-Ray diffraction was used to pinpoint case depth. This German process is being used on carbon steel. In one reported case, a 1045 steel gear replaced an alloy gear.

To a lesser extent, it's being used with ductile iron and has been used to put a thin, but highly wear-resistant surface, over a normal carburized case. However, it's being pushed for high fatigue strength where the thin case is a factor in boosting fatigue life. The thin case may also account for some of the problems reported in getting Rockwell hardness tests.

Intergranular oxygen was traced by one engineer to atomic oxygen in CO and CO_2 gases used in heat treating. In any event, it's pointed out, penetration doesn't exceed 0.015 in. Discussion of the growing controversy on dewpoint versus CO_2 control was slated for attention next year.

Computer Outlook—On the use of computers in production control, J. S. Ross, A. O. Smith Corp., says: "It's on people we rely—systems only try to help them. We're working on a program. We certainly don't expect a computer to solve all the problems in production. But we can get one step closer to (optimum) production through use of computer scheduling."

The computer as a tool for production control was hailed by several major companies. One automotive manufacturer reports its large unit ". . . is now just about loaded to capacity. It may be time to begin thinking of a second of equal size." The first one is on call for jobs as varied as solving design problems for product-design teams, to line-balancing problems in production control.

Early Stage—C. S. Knox, co-ordinator for data processing at Allis-Chalmers Mfg. Co., points out that it's too early for the computer to produce a hairline forecast on which production schedules can be based. But computers allow production departments to react much more quickly to forecast changes than they have been able to in the past.

Said one major auto parts maker: "We've been able to take down our overall inventory by 20 pct, simply because we can move on shorter lead time with computer production scheduling."

The next step called for in adapting computers to production use centers on a link between economic lot sizes (as goods are purchased), and available machine space—to be related by a computer. It's figured that savings may be enough to justify a continuing program of new machine-tool purchases.

Tool Builders Fight Fixed Wage

Labor Secretary Goldberg is expected to issue a minimum wage for the machine tool industry soon. He has the power through the Walsh-Healey Act.

Tool builders—and industry in general—oppose it.

By R. W. Crosby

▪ Labor Secertary Arthur Goldberg will soon make a precedent-shattering wage determination for the machine tool industry. And his decision may affect industry in general.

This will be the first determined minimum wage for the machine tool industry. Mr. Goldberg may also set a precedent by incorporating fringe benefits in his decision.

Union officials, led by the International Assn. of Machinists, asked the Labor Secretary to set the minimum wage at $2.15. Industry officials, through the National Machine Tool Builders Assn., say the minimum wage should be $1.60. And, industry says, it should not include fringe benefits.

The Breakdown—Labor's request for a $2.15 minimum includes 22¢ for fringe benefits. Broken down, half of the 22¢ is for paid sick leave; the rest is for welfare contributions. Fringe benefits have never before been incorporated in a determination for industry under the Walsh-Healey Public Contracts Act.

The Act gives the Labor Secretary authority to determine minimum wages on work done on government supply contracts of $10,000 or more.

Labor has long considered the lack of a W-H determination for the machine tool industry to be a thorn in its side. Now there is little doubt that Mr. Goldberg will remove that thorn.

Big Question—The major question is how high the wage will be set. A tentative decision is expected in a few months.

Of course, industry leaders are worried over the effects of the decision on non-government contracts. Though the ruling actually covers only the government contracts over $10,000, it could have a spiralling effect on wage costs throughout the industry.

With the machine tool industry in a generally depressed state, the minimum wage tends to be inflated, according to executives. Therefore, they argue, statistics are distorted.

Industry in general fears the use of the W-H Act to boost wages. Other determinations from the Labor Secretary may also be made for the motors, generators and electronic equipment industries.

Two Surveys—NMTBA produced its own survey at the recent Washington hearings because it didn't believe the government survey covered all types of machine tool manufacturers. Grayson M. Stickell, president, Landis Machine Co., Waynesboro, Pa., is making this report public. He says the official record shows many failures of the Labor Dept. to consider relevant facts.

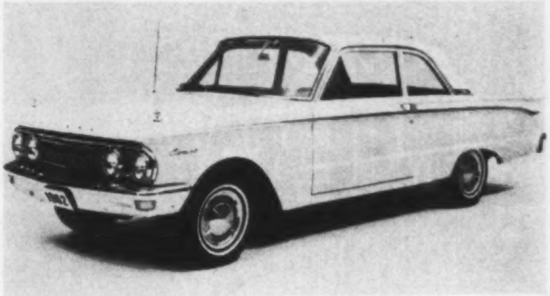
The association also takes sharp issue with the government by saying the 1960 survey contains many errors. Among these, notes NMTBA, is the definition of "covered employees." There are many low-wage employees, including apprentices, that would benefit from any minimum wage determined by the Labor Secretary.

Lukens Expands

Lukens Steel Co. will build a second 100-ton electric furnace at its Coatesville, Pa. works. The $6,250,000 project will include a scrap handling area, a mold stripper building, and other facilities.

Dealers' Choice: 7 Car Styles

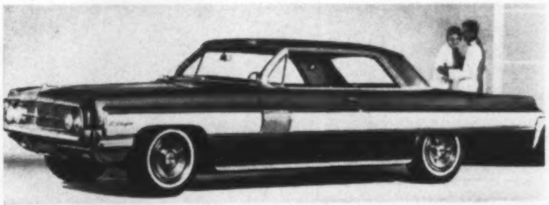
■ For the auto industry, 1962 will be the year of profusion. For prospective buyers it could prove to be the year of confusion. The new cars are starting to make their appearance. And nearly all of the automakers have added new models and new series to their lines. All in all, the buyer will be faced with about 400 different models from which to make his selection. Add to this the countless combinations of the many items of optional equipment and selecting an automobile becomes a major undertaking. Here are a few of the cars. Take your pick.



COMET: New Custom series increases models to nine. It has a new grille and a new rear appearance.

LANCER: Gran Turismo is new prestige sports model. It's available with either a 101 or 145 hp engine.

MERCURY: Nine engine-transmission combinations. The crisp roof line is four-in. longer for 1962.



OLDSMOBILE: Starfire coupe has aluminum band. Standard are bucket seats, sports-type power console.

PLYMOUTH: Fury and other models have a new look. Wheelbase and overall length have been shortened.

LARK: Longer and lower, it has continental grille. The wheelbase has been lengthened on all models.

DART: There's plenty to chose from among 23 models. This is the middle-line "330" two-door hardtop.

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What Causes Most Inflation?

Economic surveys in many countries show that four factors cause price rises.

But one recent study suggests that business pricing polices are not a "serious inflationary problem."

▪ What contributes most to inflation? Is it excess demand, wage increases, or price boosts?

Recent events focus attention on this issue. There's concern that the new wave of defense spending may bring on new inflation. On the other hand, the government has asked the steel industry to forego any upward price adjustments this fall because of possible inflationary effects.

Against this background, some interesting conclusions about inflation—and its causes—are suggested by the First National City Bank of New York in its most recent business letter.

The Bank discusses a report on "The Problem of Rising Prices" published by the Organization for European Economic Cooperation. (This group is now the Organization for Economic Cooperation and Development, including the U. S. as a member.)

The Big Four—The study, based on the experiences of twenty nations during the years 1953-60, singles out four factors behind rising prices: Special or temporary influences, (bad harvests, increased sales or excise taxes, etc.); excess demand for goods and labor; excessive negotiated wage increases; and monopolistic pricing.

Two of these—excess demand and excessive wage increases—were judged of "predominant importance" behind rising prices. The OEEC did not find business pricing policies a serious inflationary problem.

"The danger of aggressive pricing to raise profit margins is a limited one. . . . An increase in profit margins differs from an increase in wages; there can be a wage-price spiral but there cannot be a profit-price spiral, for the simple reason that the damping effect of higher prices on output and sales would be immediate when consumers' incomes were not rising.

"Moreover, a deliberate rising of profit margins is necessarily limited at any time to a few industries—there is no 'profits round.' "

Slimmer Margin — To this, the First National adds, "The idea that rising prices in the U. S. stem from arbitrary price increases designed to fatten profits is denied by the fact that competition is too keen to permit it.

"This is apparent in the record of profits, which have not been keeping up with the growth of the gross national product."

The relation of inflation to growth is also studied in the OEEC report.

"Perhaps more than in most countries, inflation in the U. S. has been an obstacle to economic growth. We believe that moderation in the rate of the wage increase is fundamental to avoiding such inflation in the future."

Shortage of Managers Hurts

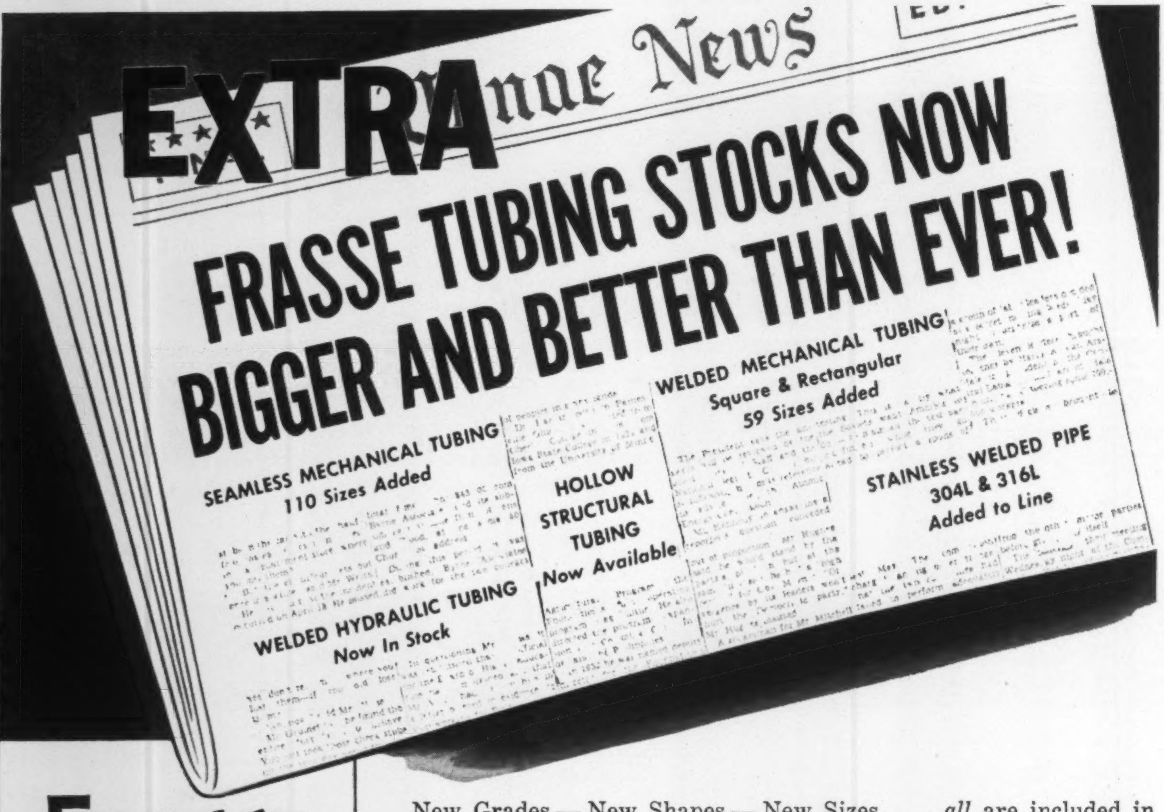
▪ Concern about the lack of qualified managers is not limited to the U. S.

A shortage of qualified managers is seriously delaying the full potential growth of business throughout a large part of the world, according to a study of eight nations just released by the National Industrial Conference Board.

Completed under grants administrated by the NICB and the Stanford Research Institute, the report covered the United States, Chile, France, Germany, Great Britain, India, Italy, and Japan.

Needed By All—In each country, economic factors were given as the primary reasons for the increased interest in management development. Highly industrialized nations need managers competent to conduct the large and complex businesses typical of these economies. In countries where industrialization is fairly recent, resourceful managers are needed to guide new economic units.

In the U. S., the NICB notes, all but the smallest firms are involved in company-sponsored and conducted development activities. Rapid growth, changes in organization structure, and pressure from foreign competition have focused attention on the need for more highly trained professional managers.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Caution Prevails as Spending Plans Turn for the Better

As the economy improves management is stepping up the tempo of new capital appropriations.

But as yet no flood of funds is being turned loose for future capital goods spending.

By E. C. Beaudet

▪ Recovery in capital goods spending by metalworking companies is headed into a steady but slow uphill climb.

While the turning point has been passed, metalworking management has yet to turn loose a flood of new funds for future plant and equipment spending.

Management's cautious approach to new expansion projects shows up in a second quarter survey of metalworking capital appropriations conducted for The IRON AGE by The National Industrial Conference Board.

Continued Recovery—In the second quarter some 38 metalworking industries authorized slightly over $689 million for new plants and equipment. Though not a startling sum, the figures does point to a continuation of the gradual recovery which started in the first quarter.

Since capital appropriations foreshadow plant and equipment spending, capital goods makers can look forward to steady sales gains but no market breakthroughs.

Actually, the rate at which metalworking management is stepping up the momentum of new capital outlays is more encouraging than the dollar amounts.

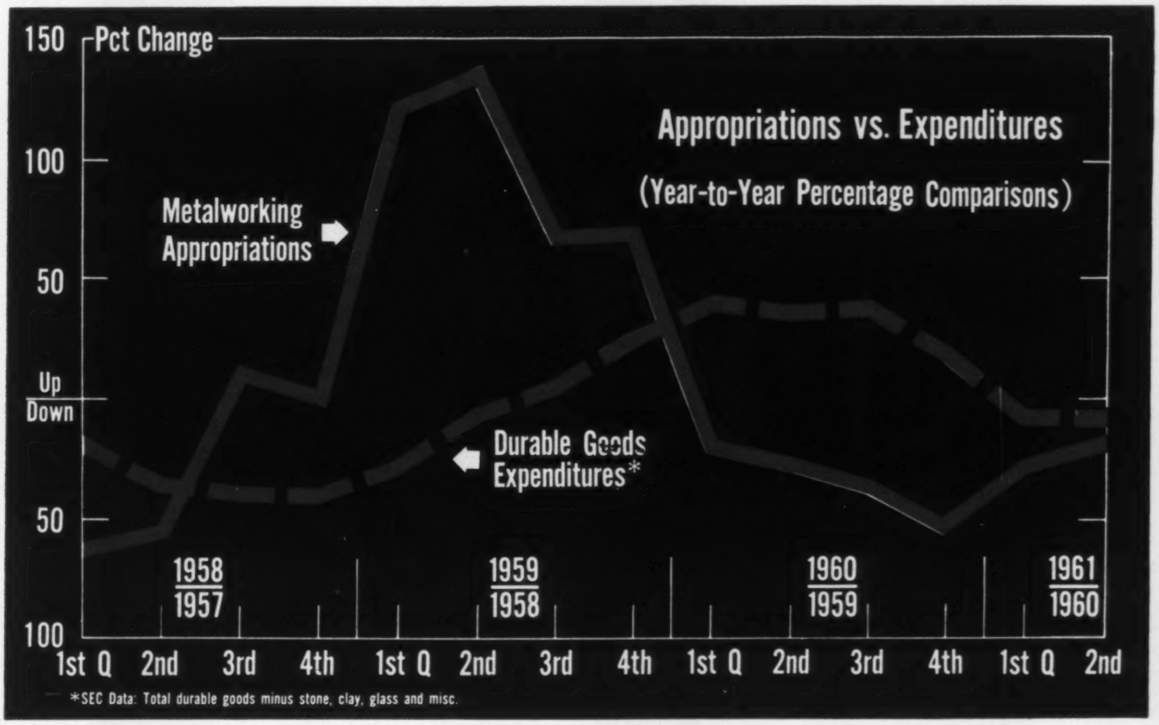
Metalworking's Capital Spending Plans

No. 3 of a 1961 Series

Three Important Signs — Three signs in the second quarter survey show management's increasing appetite for new expansion. They are:

Further improvement in yearly

Rising Momentum of New Appropriations



*SEC Data: Total durable goods minus stone, clay, glass and misc.

Seasonal Appropriations Trend Picks Up

Pct Changes—First to Second Quarters

	1957	1958	1959	1960	1961	5-year Average
Primary Metals	−14	−13	−54	−10	−32	−25
Fabricated Metals	−44	−9	−16	−36	+7	−20
Machinery	−34	−27	−15	−54	−26	−31
Elec. Machinery	−59	−14	+53	−20	−27	−13
Trans. Equipment	−50	−56	+43	−32	+36	−12
Instruments	−48	−36	−4	−22	−41	−30
Total Metalworking	−34	−32	−22	−27	−10	−25

comparisons of percent changes in new appropriations;

Less than average seasonal declines from the first to second quarter;

An increase in the number of industry groups reporting higher appropriations in the second quarter.

The chart on p. 73 shows the increasing momentum of new metalworking capital appropriations. It compares yearly percentage changes in appropriations with expenditures for durable goods.

Ready for a Rise—The low point of the most recent appropriations cycle was hit in the fourth quarter of last year. Since then, and for two quarters in a row, the curve has trended upward.

The expenditures cycle, meanwhile, hit bottom a full quarter later and flattened out in second quarter 1961.

Conference Board economists says this means that metalworking expenditures may already have started to pull out of the trough to follow the rising appropriations trend.

Less Than Seasonal—The second sign of gradual recovery in capital spending by metalworking companies is the less-than-seasonal decline in new appropriations from the first to second quarter.

For the last five years, the first-to-second quarter drop in capital appropriations averaged 25 pct. A 10 pct decline in second quarter 1961, however, was considerably less than average.

More Higher Approvals — The third major trend sign in metalworking appropriations is the so-called diffusion index. This means the percentage of industry divisions reporting higher, lower and unchanged capital setasides compared with the same quarter a year ago.

In the second quarter of this year, the percentage of divisions reporting higher approvals jumped almost 8 points over the first quarter. And those reporting lower approvals dropped 11 pct from first-quarter rates.

Despite these gains, more industry divisions reported lower appropriations approvals compared to a year ago. Forty-six percent report lower approvals, 44 pct higher and 10 pct no change.

So, while there was a definite change for the better from the first to second quarter of 1961, it is obvious that metalworking management is far from setting out on a capital spending spree.

With the economy moving up generally, it's better than an even chance that metalworking capital appropriations will show even more improvement in the third quarter survey.

Spotty Pattern — While these comparisons show a quickening tempo of capital appropriations in metalworking, actual dollar amounts set aside for future capital goods spending still show a spotty recovery pattern.

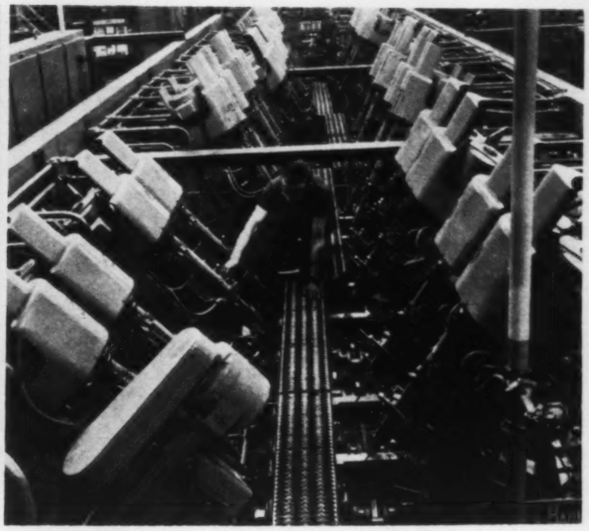
Compared to the second quarter of 1960, three of the six major metalworking industries showed second-quarter gains. These include: Fabricated metal products, up 3 pct; Non-electrical machinery up 11 pct; And a healthy 46 pct boost by manufacturers of transportation equipment.

On the down side, the primary metals industry lead the way with a 52 pct decline in second quarter appropriations versus second-quarter '60. Following primary metals, manufacturers of electrical machinery and instruments reported drops of 24 and 25 pct.

Primary Metals—In the primary metals industries the basic iron and steel group, iron and steel foundries and the nonferrous smelters recorded further declines in the second quarter of 1961 from the first quarter.

Basic steel and the iron and steel foundries seem to be appropriating on a necessity basis. No new expan-

GOING UP: Fabricators of structural metal products boosted new appropriations for plants and equipment over 150 pct from first to second quarter.



AUTOS GAIN: Encouraged by a brighter market for '62 models, automakers increased new capital outlays 64 pct over first quarter '61.

sion seems in sight because of the current adequate capacity and a competitive squeeze on profits. Net profits after taxes in primary iron and steel dropped by about 74 pct in the first quarter of 1961 from the first quarter of 1960.

However, appropriations by rollers, drawers and extruders of nonferrous metals, gained 125 pct; nonferrous foundries, 501 pct; and miscellaneous primary metals, 27 pct from the first to the second quarter of 1961.

Fabricated Metals—Manufacturers of fabricated metal products marked a definite upturn from the first quarter of 1961 with a 7 pct second-quarter increase in new appropriations.

The gaining industries are cutlery, hand tools, hardware, up 7 pct; fabricated structural products, up 156 pct; and screw products and rivets, up 52 pct.

Non-Electrical Machinery—Nonelectrical machinery gained 11 points in the second quarter of 1961

(continued on page 78)

38 Industries Report on Capital Spending Plans

Major Metalworking Groups

Industry	SIC Code	Capital Appropriations—$ Millions						Pct Change	Pct Change	Pct Change
		1960				1961		2nd Qtr. 1961 over 1st Qtr. 1961	2nd Qtr. 1961 over 2nd Qtr. 1960	1st 6 mos. 1961 over 1st 6 mos. 1960
		1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.			
Metal Furniture	25	$1.7	$2.7	$3.0	$1.6	$1.4	$1.4	+ 7 Pct	−46 Pct	−36 Pct
Primary Metals	33	254.8	229.3	107.3	92.1	162.2	111.0	−32	−52	−44
Fabricated Metal Products	34	51.2	32.6	30.8	47.0	31.4	33.5	+ 7	+ 3	−23
Machinery (ex. Electrical)	35	133.5	61.7	68.5	76.6	92.8	68.5	−26	+11	−17
Electrical Mach. & Equip.	36	87.4	70.3	44.9	66.6	73.3	53.5	−27	−24	−20
Transportation Equipment	37	183.3	125.4	168.8	121.7	134.4	182.8	+36	+46	+ 3
Instruments, etc.	38	17.2	13.4	14.2	8.2	17.2	10.1	−41	−25	−11
Total Reported[1]		729.1	535.4	437.4	413.9	512.5	460.8	−10 Pct	−14 Pct	−23 Pct
Total Estimated for All Metalworking[2]		$1151.9	$844.8	$653.5	$636.9	$819.2	$689.3	−16 Pct	−18 Pct	−24 Pct

Based upon returns from 483 companies reporting 709 separate industry groups.

[1] Excludes ordnance and accessories, SIC Code 19, and miscellaneous manufacturing, SIC Code 39.

[2] Estimated for entire metalworking universe. This includes metalworking firms operating at least one plant employing 500 or more production workers in 1957. See coverage table, page 78.

Source: The National Industrial Conference Board.

Primary Metal Industries

		Capital Appropriations—$ Millions						Pct Change	Pct Change	Pct Change
		1960				1961		2nd Qtr. 1961 over 1st Qtr. 1961	2nd Qtr. 1961 over 2nd Qtr. 1960	1st 6 mos. 1961 over 1st 6 mos. 1960
Industry	SIC Code	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.			
Blast Furnaces, Steel Wks. & Rolling Mills	331	$185.1	$140.1	$43.3	$57.7	$122.1	$63.2	−48 Pct	−55 Pct	−43 Pct
Iron & Steel Foundries	332	13.2	11.9	16.3	1.3	13.4	9.9	−26	−17	− 8
Primary Smelt. Nonferrous Metals[1]	333–334	17.4	21.4	19.3	11.0	13.1	8.3	−36	−61	−45
Rolling, Drawing, Extruding Nonferrous	335	25.1	51.5	24.6	19.1	11.5	25.9	+125	−50	−51
Nonferrous Foundries	336	4.7	2.4	1.1	1.3	0.2	1.3	+501	−47	−79
Misc. Primary Metals	339	9.3	2.0	2.7	1.8	1.9	2.4	+27	+18	−63
Total	33	$254.8	$229.3	$107.3	$92.1	$162.2	$111.0	−32 Pct	−52 Pct	−44 Pct

[1] Includes secondary nonferrous smelters, SIC 334.

Fabricated Metal Products

		Capital Appropriations—$ Millions						Pct Change	Pct Change	Pct Change
		1960				1961		2nd Qtr. 1961 over 1st Qtr. 1961	2nd Qtr. 1961 over 2nd Qtr. 1960	1st 6 mos. 1961 over 1st 6 mos. 1960
Industry	SIC Code	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.			
Metal Cans	341	$22.2	$9.3	$6.5	$22.1	$6.8	$5.7	−16 Pct	−38 Pct	−60 Pct
Cutlery, Tools, Hardware	342	3.1	3.1	8.8	5.0	4.9	5.2	+ 7	+68	+61
Heating Apparatus (ex. Elec.) & Plumbing Fixtures	343	3.0	4.3	3.2	4.0	3.6	1.6	−55	−63	−29
Fabricated Struct. Products	344	13.0	4.0	3.4	7.5	5.6	14.2	+156	+260	+17
Screw Products & Rivets	345	2.0	1.3	1.1	1.2	1.1	1.6	+52	+26	−18
Stampings	346	2.6	6.5	3.6	4.7	4.3	2.0	−53	−68	−30
Coating, Engraving; Misc. Fabr. Wire Prod.	347-348	1.9	0.6	0.4	0.3	0.8	0.6	−20	+ 4	−43
Miscellaneous Fabricated Metal Products	349	3.2	3.6	3.7	2.1	4.4	2.4	−46	−35	− 2
Total	34	$51.2	$32.6	$30.8	$47.0	$31.4	$33.5	+ 7 Pct	+ 3 Pct	−23 Pct

Transportation Equipment

		Capital Appropriations—$ Millions						Pct Change	Pct Change	Pct Change
		1960				1961		2nd Qtr. 1961 over 1st Qtr. 1961	2nd Qtr. 1961 over 2nd Qtr. 1960	1st 6 mos. 1961 over 1st 6 mos. 1960
Industry	SIC Code	1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.			
Motor Vehicles & Equip.[1]	371, 375, 379	$121.3	$99.3	$133.0	$62.6	$86.3	$141.2	+64 Pct	+42 Pct	+ 3 Pct
Aircraft & Parts	372	55.1	21.7	29.7	53.9	41.3	39.7	− 4	+83	+ 5
Ship & Boat Building	373	4.3	2.5	5.3	3.3	5.6	1.0	−82	−59	− 2
Railroad Equipment	374	2.7	1.9	0.8	1.9	1.2	0.9	−23	−51	−53
Total	37	$183.3	$125.4	$168.8	$121.7	$134.4	$182.8	+36 Pct	+46 Pct	+ 3 Pct

[1] Includes motorcycles, bicycles and parts, and miscellaneous transportation equipment.

Electrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions						Pct Change	Pct Change	Pct Change
		1960				1961		2nd Qtr. 1961 over 1st Qtr. 1961	2nd Qtr. 1961 over 2nd Qtr. 1960	1st 6 mos. 1961 over 1st 6 mos. 1960
		1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.			
Elec. Transmission Equip.	361	$10.1	$13.7	$4.6	$15.3	$4.1	$7.2	+76 Pct	−48 Pct	−53 Pct
Elec. Ind. Apparatus	362	15.7	8.2	12.1	5.8	7.5	6.5	−14	−21	−41
Household Appliances	363	8.1	5.1	4.7	9.1	5.6	4.9	−12	− 4	−21
Electric Lighting & Wiring Equipment	364	6.6	11.4	3.2	6.5	8.2	12.5	+53	+10	+15
Radio & TV Receivers	365	3.0	1.9	3.4	3.5	0.6	2.2	+272	+14	−43
Communication Equipment	366	13.1	3.2	7.9	12.5	19.6	5.9	−70	+87	+57
Electronic Components	367	30.2	26.2	8.6	13.7	27.2	13.4	−51	−49	−28
Misc. Electrical Equipment	369	0.7	0.5	0.4	0.2	0.5	0.8	+72	+54	+ 8
Total	36	$87.4	$70.3	$44.9	$66.6	$73.3	$53.5	−27 Pct	−24 Pct	−20 Pct

Nonelectrical Machinery

Industry	SIC Code	Capital Appropriations—$ Millions						Pct Change	Pct Change	Pct Change
		1960				1961		2nd Qtr. 1961 over 1st Qtr. 1961	2nd Qtr. 1961 over 2nd Qtr. 1960	1st 6 mos. 1961 over 1st 6 mos. 1960
		1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.			
Engines & Turbines	351	$9.9	$5.0	$4.6	$8.0	$7.1	$5.8	−18 Pct	+16 Pct	−14 Pct
Farm Machinery & Tractors	352	9.2	7.6	7.2	9.6	15.0	7.7	−48	+ 1	+35
Construction, Mining, Handling Equipment	353	44.1	5.8	3.6	10.6	4.3	9.3	+113	+58	−73
Metalworking Machinery & Equipment[1]	354, 359	13.2	5.0	5.4	5.7	11.6	6.2	−47	+23	− 2
Special Indus. Machinery	355	9.4	11.0	7.0	9.0	8.8	9.2	+ 4	−16	−12
General Ind. Machinery & Equipment	356	28.5	8.0	8.0	10.3	19.3	6.6	−65	−17	−29
Office & Store Machines	357	17.6	15.6	27.4	18.5	25.6	22.7	−11	+45	+46
Service Industry Machines	358	1.6	3.5	5.4	5.0	1.0	1.1	+ 1	−70	−59
Total	35	$133.5	$61.7	$68.5	$76.6	$92.8	$68.5	−26 Pct	+11 Pct	−17 Pct

[1] Includes miscellaneous, nonelectrical machinery, SIC Code 359.

Instruments

Industry	SIC Code	Capital Appropriations—$ Millions						Pct Change	Pct Change	Pct Change
		1960				1961		2nd Qtr. 1961 over 1st Qtr. 1961	2nd Qtr. 1961 over 2nd Qtr. 1960	1st 6 mos. 1961 over 1st 6 mos. 1960
		1st Qtr.	2nd Qtr.	3rd Qtr.	4th Qtr.	1st Qtr.	2nd Qtr.			
Laboratory, Scientific & Engineering Instruments	381	$6.3	$4.8	$4.9	$2.7	$7.8	$5.5	−30 Pct	+13 Pct	+20 Pct
Measuring & Controlling Instruments	383	5.2	6.1	.5	3.0	5.2	2.4	−53	−60	−32
Other[1]	383, 4, 5, 6, 7	5.7	2.5	5.8	2.6	4.1	2.2	−46	−12	−23
Total	38	$17.2	$13.4	$14.2	$8.2	$17.2	$10.1	−41 Pct	−25 Pct	−11 Pct

[1] Includes optical instruments, surgical instruments, ophthalmic goods, photographic equipment and watches, clock-operated devices, SIC Codes 383, 384, 385, 386, 387.

Appropriations per Worker

All companies in the industries listed below, with plants of 500 or more plant workers were queried. They account for about two-thirds of the total employment and buying power in the metal working industry. The fourth column shows the percentage of production workers employed by the companies cooperating in this survey. The last column shows appropriations per production worker.

Industry and SIC Code	Production Workers, Thousands	Production Workers, Thousands	Pct of Total Employment	Appropriations per Production Worker,[1] $
	Companies With Plants of 500 or more	Cooperating Companies	Cooperating Companies	
Metal Furniture, 251, 252 253, 254, 259	31	12	38 Pct	$ 629
Blast Furnaces, Steel Works, Rolling Mills, 331	595	313	53	913
Iron and Steel Foundries, 332	81	61	75	670
Primary & Secondary Smelting, Nonferrous, 333, 334	54	50	92	1,041
Rolling, Drawing, Extruding, Nonferrous Metals, 335	114	80	71	1,007
Nonferrous Foundries, 336	19	13	67	310
Misc. Primary Metals, 339	37	22	59	397
Metal Cans, 341	47	45	95	921
Cutlery, Hand Tools, Hardware, 342	54	35	65	673
Heating Apparatus (except elec.) & Plumb. Fixtures, 343	34	21	61	591
Fabricated Struct. Prods., 344	60	30	50	1,023
Screw Prods. & Rivets, 345	26	15	60	412
Stampings, 346	75	43	67	340
Coating, Engraving; Miscellaneous Fabricated Wire Products, 347, 348	21	10	47	217
Mis. Fab. Metal Prods., 349	54	36	67	350
Engines & Turbines, 351	71	58	82	435
Farm Mach. & Tractors, 352	60	34	56	1,166
Construction, Mining Handling Equipment, 353	111	78	71	354
Metalworking Machinery & Equipment, 354, 359	105	64	61	451
Special Industry Mach., 355	47	22	48	1,518
General Industrial Machinery & Equipment, 356	92	62	67	714
Office & Store Machines, 357	78	58	74	1,636
Service Ind. Machines, 358	38	22	59	555
Elec. Trans. Equip., 361	90	49	54	640
Elec. Ind. Apparatus, 362	134	65	48	493
Household Appliances, 363	96	46	48	489
Electric Lighting & Wiring Equipment, 364	55	30	54	1,023
Radio & TV Receivers, 365	71	27	38	359
Communication Equip., 366	113	52	46	892
Electronic Components, 367	95	62	65	1,015
Misc. Elec. Equipment, 369	27	8	29	253
Motor Vehicles & Equip., 371, 375, 379	638	558	86	759
Aircraft & Parts, 372	522	481	92	342
Ship & Boat Building, 373	61	31	50	494
Railroad Equipment, 374	43	26	61	186
Laboratory, Scientific & Eng. Instruments, 381	41	16	39	1,315
Measuring & Controlling Instruments, 382	41	26	64	540
Other, 383, 384, 385, 386, 387	77	20	26	729
Total	4,008	2,681	67 Pct	$680

*** Based upon returns from 483 Companies reporting 709 individual industry codes. Employment figures based on Iron Age Census data, 1957. Figures in last column calculated from unroanded data. Over 1,200 plants with 500 or more production workers reported.**

[1] In dollars per production worker, based on appropriations made from first quarter 1959 through third quarter 1959 and plant employment of reporting companies in 1957.

SOURCE: The National Industrial Conference Board.

(continued from page 75)

over the second quarter of 1960.

Engines and turbines; farm machinery; construction, mining, material handling equipment; metalworking equipment; general industrial machinery and office and store machines raised appropriations from one to 58 pct over the same quarter a year ago.

Electrical Machinery—In second quarter '61 the electrical machinery industry cut its appropriations by almost one fourth below the same quarter a year-earlier and about the same amount from the first quarter.

Even so, four out of eight industries in this group scored gains over the first quarter of 1961. The improving industries include: electrical transmission equipment, up 76 pct; radio and television communication equipment, up 272 pct.

Transportation Equipment — In the second quarter of 1961 approvals of the transportation equipment industries gained about 36 points over the first quarter of 1961.

Two out of four industries in these groups showed good sized improvements in appropriations compared to second quarter 1960. Sharp gains of 42 and 83 pct were posted by motor vehicle manufacturers and aircraft makers.

The industry which showed clearly declining appropriations in the second quarter was the ship and boat building industry. It dropped new appropriations 82 pct below the first quarter and 59 pct below second quarter 1960.

Instruments—In the second quarter of 1961 instruments cut back their appropriations by about one quarter compared to the level of a year ago.

Two out of three groups in the industry accounted for the declines.

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Can Detroit Match the VW?

There Are Reports That Ford, Chevy May Try

Volkswagen of America looks for U.S. sales of more than 200,000 cars in 1962. This may prompt some competition from Detroit.

But there are doubts that American automakers can match VW in its field.

By A. E. Fleming

- Can a domestic automaker successfully make and sell a Volkswagen-size car in the U. S.?

The question becomes more intriguing as reports persist that Ford, and perhaps Chevrolet, may attempt to do so in 1962.

Some American auto officials think it is folly to try. They refer to high U. S. labor and tooling costs as reasons why it would be a strain to compete against European imports. They also point out that the import market is leveling off to 300,000-400,000 cars annually—hardly a worthwhile sales arena.

One interesting point of view comes from C. H. Hahn, general manager of Volkswagen of America. In Detroit last week to present his 1962 models (only outward change is larger taillights), Mr. Hahn says: "Why not an American-built competitor to Volkswagen? I think there's a market for one."

Big Success—Naturally, the VW official has justifiable confidence in this country's small car market. His own product has met with nothing but success. Volkswagen will collect three pct of the new car market in the U. S. in 1961. This is its biggest share ever, with sales up almost 10 pct over year ago. From his vantage point, the small car market in America is an attractive one.

So a logical query might be: "Why doesn't VW build cars in the U. S.?" Actually there was thought of doing this in the mid-1950's. VW bought, but quickly sold (at a profit), a plant in New Jersey for assembly purposes.

Emphasizing that his company now has no intent whatsoever of assembling Volkswagens in America, Mr. Hahn says the reason thinking changed so abruptly was that "We would have had to raise the price of the car in order to match the quality we were building into it in Germany."

In Europe Too—He explains further that the price of the VW in Europe probably would have gone up, too. Production volume in the German plant would have dropped in proportion to the number that would have been made in the U. S.

"When we were thinking of producing here," explains Mr. Hahn, "we were impressed by the extremely low prices on U. S. sheet metal and raw materials. They were very attractive. At that time there was shortage of metal in Europe."

However, when VW started talking with subcontractors here and told them of the relatively low parts volume that would be needed (Volkswagen sales in the U. S. didn't top 50,000 until 1956), "they practically threw us out."

Automation—So a big element was high tooling costs. "It would have been very expensive to tool up to our automation standards," says Mr. Hahn. "We have the highest degree of automation in the industry at our German plant."

Labor costs were only a small consideration in thinking of assembling cars here. "Many reports erroneously said this was the main reason for our changing our mind."

A rather obscure fact but an important one in VW's scheme of things, is that the Volkswagen sedan enjoys the highest production of any one model in the world.

The Massive Look—Minus Fins

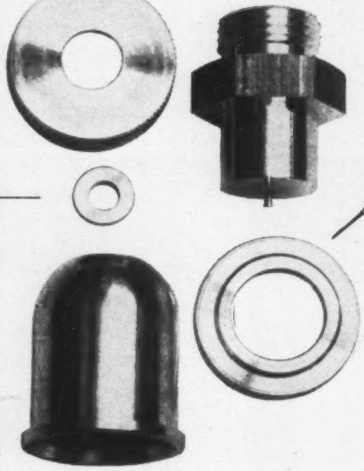
CADILLAC: The 1962 Cadillac is massive in appearance. It features a new grille with the familiar cross-hatch design, and reduced tail fins.

Switch Control:

Another Olin alloy change saved the manufacturer about 7% on metal and resulted in higher machine operating speed.

Aircraft Fitting:

Superior surface finish of Olin hexagonal bar eliminated need for secondary finishing operation.



Clock Time Wheel Hub:

An Olin-recommended alloy change resulted in a raw material cost saving of 11%.

Fuel Valve Body:

Olin rod and Olin technical help reduced machining time from 5.5 to 2.4 seconds.

Electronic Part:

The high quality of Olin Aluminum improved the surface finish 25%. Reduced machine down time.

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These endorsements from various manufacturers are typical of the results achieved through Olin's technical assistance—and the use of Olin Aluminum Rod and Bar. Olin *cold processed* Aluminum Rod and Bar is ideal for screw machine products because of its uniform structure and fine surface finish. Olin's Distributor network, coast to coast, carries a full range of this stock in a variety of sizes and alloys. These same Distributors, or your nearest Olin Aluminum Sales Office, will arrange for Olin's technical and marketing service if you'd like some help. Look in The Yellow Pages.

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Defense Buying to Trim Jobless

California Expects to Get 25 pct of Added Defense Funds

Defense budget has been upped by $4 billion. California expects to get $1 billion of this.

This should help ease high unemployment. So should a new state program to teach skills to jobless workers.

By R. R. Kay

▪ Despite the rumors, don't look for the West Coast aerospace industry to get a smaller share of defense contracts. Here's why:

1. The region is a hugh research and production complex;
2. It includes a vast system of experienced subcontractors;
3. It has a big concentration, 25 pct, of the vital electronics industry.

Air Arsenal—In the transition from aircraft to missiles, the region retained its position as the nation's air arsenal.

Every day brings fresh proof that Pentagon planners will keep it that way. It continues to receive some 25 pct of aerospace contracts. That's the West Coast's historic share.

The extra $4 billion tacked onto the nation's defense budget means that California alone should get $1 billion of it. Gov. E. G. Brown says, "Directly or indirectly, this action may be expected to generate some 175,000 jobs in California."

High Jobless Rate—But, like other industrial states, unemployment is plaguing California. Right now it's 6.8 pct. And, as elsewhere, the state is working hard to reduce it.

As in other industrial centers, automation is a factor in unemployment. However, California's legislature has passed two laws to ease the impact of automation on employment.

Aid to Upgrade—The first law applies to workers who have already lost their jobs through automation. They can get up to $55 per week, for 26 weeks, while they attend school to learn new skills.

The second law gives workers whose jobs are threatened by automation a chance to study new skills on-the-job.

The state's business and labor leaders will meet Nov. 28 in Los Angeles for an automation parley. Aim: To provide guidelines for action.

Wood Replace Steel?

One of these days there's a good chance that construction steel will be facing competition from yet another material—wood. That is, if Pacific Northwest wood researchers are successful.

They're trying to grow fireproof wood in their laboratories. Other ideas in the test tubes: Hardened long-wearing lumber; factory-applied finishes; and wood not bothered by moisture, heat or cold.

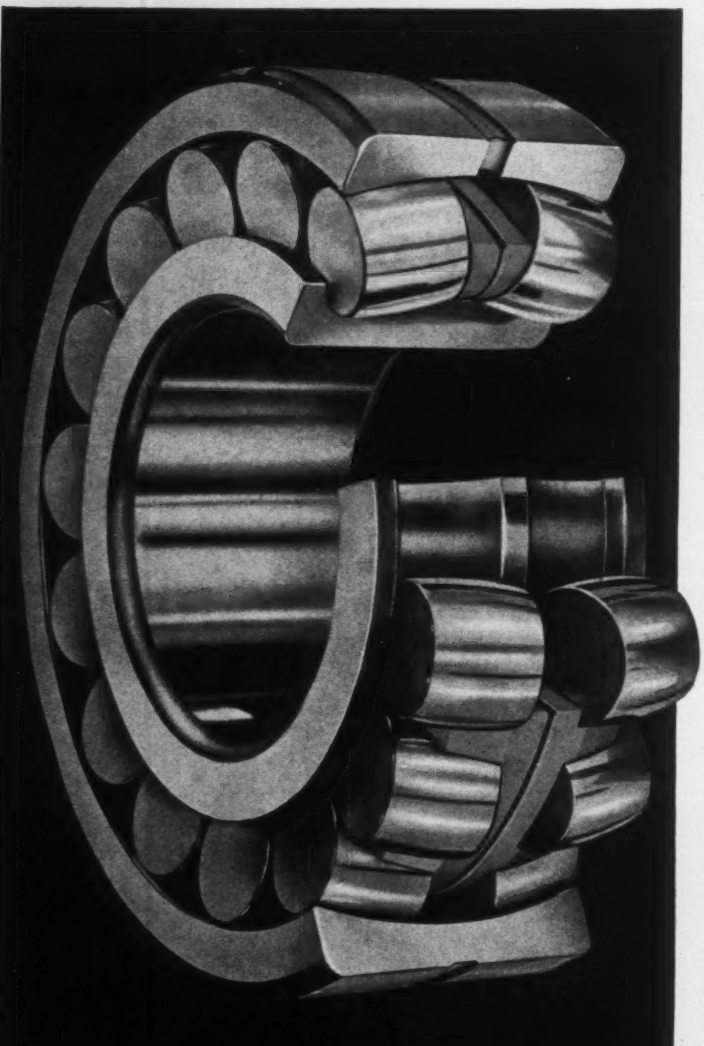
Reward for Labor Peace Efforts

The Father Coogan Award
The Father Coogan Award

INDUSTRY AND LABOR: Kaiser Steel Corp. and United Steelworkers of America have been cited for their work in setting up a committee to seek an end to industrial strikes. Catholic Labor Institute of Los Angeles named them to receive the Father Coogan Award. From left to right are: Msgr. John Truxaw, presenting awards; Edgar F. Kaiser; California Gov. E. G. Brown; and David J. McDonald.

LINK-BELT SPHERICAL ROLLER BEARINGS:

measure these design values in terms of your applications



GREATER CAPACITY!

The reason? *More rollers, larger rollers!* Bearing capacity depends primarily on effective roller Length, roller Diameter and Number of rollers (L x D x N). And Link-Belt offers the *largest effective roller complement* for all sizes of spherical roller bearings . . . rated according to accepted formulas of the Anti-Friction Bearing Manufacturers Association. This increase in LDN values provides extremely high-capacity . . . and in users' evaluation, it adds up to far longer bearing life.

GREATER DURABILITY!

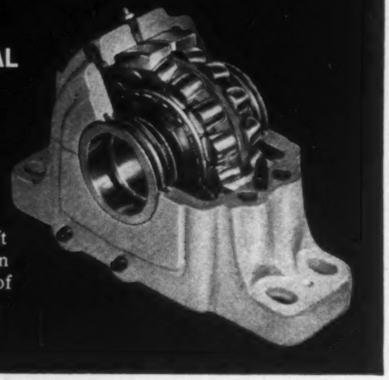
With balanced proportion design, Link-Belt spherical roller bearings possess durability characteristics that exceed the bearing industry's exacting requirements. Optimum balance of rollers, inner and outer rings must be obtained for increased bearing capacity . . . yet overall bearing dimensions must conform to an established international standard boundary plan.

Wrap-around, completely contoured retainers also contribute to durability through positive roller guidance and spacing. Precision-machined of centrifugally cast bronze, these husky retainers are far stronger than stampings or sand castings.

GREATER PRECISION!

Link-Belt spherical roller bearings are made in the world's most modern bearing plant . . . with the most-advanced tools and techniques known to industry. A rigid quality control program leaves *nothing* to chance. Each Link-Belt bearing is subjected to *758 actual inspections.* Micro-smoothness and precision are continuously scrutinized by automatic machines. Result: these bearings have been specified by leading manufacturers of cranes, shovels, graders, vibrating screens, and steel mill, paper mill and foundry equipment . . . and for high-precision applications such as embossing rolls, printing presses and torque converters.

SEE BOOK 2760 for further precision, durability and high-capacity features. Contact your nearest Link-Belt office or authorized stock-carrying distributor. Look under BEARINGS in the Yellow Pages of your phone book.



LINK-BELT SPHERICAL ROLLER BEARING PILLOW BLOCKS

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Builder Views Japanese Market

C. B. DeVlieg Says It Needs Best Production Equipment

Japanese metalworking offers a good market for U.S. goods that can be made even better.

But it takes top-level selling to get the most out of this market, says an expert.

By R. H. Eshelman

▪ Many metalworking executives may be underestimating a potentially excellent market abroad, some foreign trade experts both in government and in private industry believe. That market is Japan.

Unfortunately there are some common misunderstandings that pose barriers. United States is Japan's best customer, the Commerce Dept. reveals; Japan is the second or third largest foreign market for U. S.

A veteran world traveler and pioneer of the machine tool industry, C. B. DeVlieg, board chairman and founder of DeVlieg Machine Tool Co., filed a revealing report earlier this year with the government. It summarized his findings as a part of an official U. S. trade mission to Japan.

Japan Can Profit—Mr. DeVlieg notes that Japanese industry can well profit at this time by adoption of many American precision production techniques. This means also that there may well be a substantially larger market for American equipment and tools, if they are properly presented.

For instance, during this latest visit he had the opportunity to tell the story of this country's research and development programs in metals manufacturing. He also related the significance of this to Japanese metalworking industries, on many occasions.

Specific topics included the effect of high accuracy on products processed, importance of cutting tools; effect of temperature on operation of machine tools and the effect of good plant housekeeping.

"Turn Things Around"—Mr. DeVlieg points out that as a converter nation—processing imported raw materials to finished goods—Japan needs the best production equipment to stay competitive in world markets. "So if you have what they need, and can show valid reasons for adoption of your product, you can develop a good market."

"First, however," he warns, "analyze the situation both from an economic and human viewpoint. Turn things around and look at them from the other side."

Since many of the Japanese metalworking plants are small firms, of 50 employees or less they must be approached on an individual basis. Also, social and personal relationships are very important in this populous country. As Mr. DeVlieg puts it "business is best conducted in Japan at the high levels."

At the Top—That means that the company president, board chairman or other top executive must go himself and establish proper contacts at the top. Lower echelon representatives may find it tough sledding.

DeVLIEG: "Turn things around and look at them from the other side."

MEN IN METALWORKING

H. E. Martin, named chairman and chief executive officer, Metal & Thermit Corp.

C. J. Beasley, named president, Metal & Thermit Corp.

H. W. Buchanan, named executive vice president, Metal & Thermit Corp.

Borg-Warner Corp. — Harold Nutt, elected chairman and chief executive officer, Borg & Beck Div.

American Society of Association Executives — F. K. Donaldson, elected president.

Allis-Chalmers Mfg. Co.—T. D. Lyons, elected vice president, administration, Industries Group.

Sibley Machine and Foundry Corp.—W. H. Voll, elected vice president, sales; P. G. Hahl, elected secretary; B. J. Voll, elected chairman of the board.

P. R. Mallory & Co. Inc.—R. H. Wilcox, asst. to the president.

Fansteel Metallurgical Corp.—J. G. Norris, appointed asst. to the president.

Chrysler Corp.—K. P. Mazurek, appointed general manager, Export-Import Div.

General Motors Corp.—L. J. Bentley, appointed general superintendent, production, Chevrolet Tonawanda engine plant.

Westinghouse Electric Corp.—W. S. Perkins, appointed director, purchases, consumer products group; R. T. Nalle, Jr., appointed managing director, Ateliers Jaspar, S. A.

Allied Chemical Corp.—W. C. Runch, named director, development research; Dr. Robert W. Mason, named director, laboratory research; C. D. Boyer, Jr., named director, planning research; R. E. Bankert, appointed product manager, General Chemical Div.; G. M. Feeser, Jr., appointed plant manager, Baker & Adamson Works of Allied Chemical's General Chemical Div.; W. E. Houghton, appointed manager, market surveys, General Chemical Div.

Pittsburgh Plate Glass Co.—W. F. Newton, appointed director, marketing planning, Merchandising Div.

J. E. McIntyre, elected president, Sibley Machine and Foundry Corp.

Tullamore Electronics Corp.—G. A. Kalantzis, appointed director, technical services.

Willys Motors, Inc.—J. A. Currie, named director, corporate planning.

Litton Systems, Inc.—A. G. Clark, appointed director, Applied Communication Systems.

Radio Corp. of America—R. J. Segal, appointed manager, design engineering.

Rockwell Manufacturing Co.—G. J. Groya, named manager, power tools, Germany.

Perfect Circle Corp. — J. D. Bryan, named general manager, Speedostat Div.

(Continued on P. 88)

F. J. Shanaberg, appointed vice president, marketing, American Welding and Manufacturing Co.

Ohio

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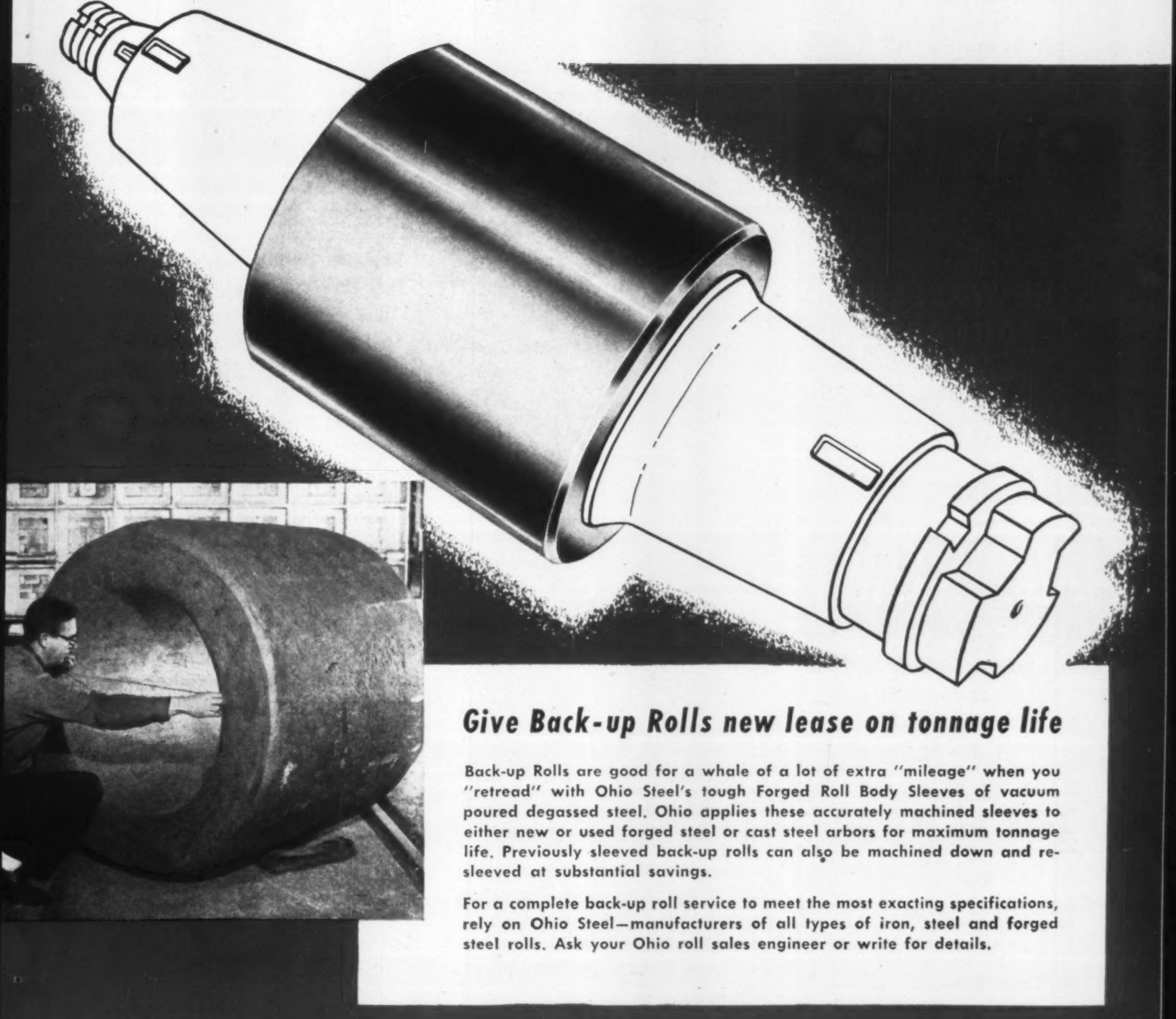

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(Continued from P. 86)

Avco Corp.—C. R. Irvine, appointed general operations manager, Richmond plant, Electronics and Ordnance Div.

Yale & Towne Manufacturing Co.—W. E. Rodriguez, named export department administrator, Yale Materials Handling Div.

Armco International Corp.—Cyril Galbraith, named regional director in Northern Latin America.

Thompson Ramo Wooldridge Inc.—J. J. Childs, named Eastern regional manager, Industrial Control Systems.

Tuthill Pump Co.—O. G. Mahnensmith, appointed divisional sales manager, Fill-Rite Div.

Anaconda American Brass Co.—H. M. Vaill, named sales manager, Ansonia Div.

Climax Molybdenum Co.—F. J. Maratray, appointed development manager, Paris office.

Hanson - Van Winkle - Munning Co.—F. A. Pitschke, appointed sales manager, Electrochemical Machining Div.

Hills-McCanna Co.—R. E. Lindquist, named industrial sales manager.

Maytag Co.—L. O. Hays, named acting traffic manager; W. C. Pink, appointed manager, Hampton, Iowa, plant.

Mueller Brass Co.—C. E. Pollex, appointed sales representative.

Reynolds Metals Co. — W. S. Acuff, appointed sales promotion manager; D. A. Kurr, named regional manager, Reynolds architectural and building products.

Sellstrom Manufacturing Co. — Cecil Miles, appointed southwestern factory sales representative.

Ford Motor Co.—R. Price, appointed Autolite product merchandising manager, Autolite Div.

Fort Pitt Bridge Works—G. C. Hofmeister, named contract sales manager.

C. A. Thomas, Jr., named secretary, Standard Pressed Steel Co.

Imperial Electric Co. — E. A. Kitsch, named sales manager, Akron, O.

Studebaker-Packard Corp.—R. K. Robinson, appointed asst. general sales manager.

Colorado Fuel and Iron Corp.—M. K. Jones, appointed manager, sales and services, Realock Fence Div., Northern California District; W. W. Agrella, appointed asst. to the product sales manager, Realock Fence Div., Oakland office.

Crucible Steel Co. of America—W. G. Scharnberger, appointed sales manager, Magnet Div.

Aluminum Co. of America—F. C. Irving, Jr., appointed manager, engineered product sales; W. B. Renner, appointed asst. New York district sales manager.

Will Mitchell, Jr., appointed director, Research Div., Allis-Chalmers Manufacturing Co.

F. C. Hyde, Jr., appointed general sales manager, Revere Copper and Brass Inc.

Raytheon Co. — J. D. Bowen, named sales manager, Sorenson product lines.

Hooker Chemical Corp.—W. D. Morrison, named general manager, International Div.

Burroughs Corp.—H. G. Weber, Jr., appointed controller, Electronic Components Div.

Gregory Industries, Inc.—F. H. Kettle, appointed controller.

Joseph T. Ryerson & Son, Inc.—W. J. Kalt, appointed general superintendent, St. Louis plant.

American Zinc, Lead & Smelting Co.—O. C. Klein, named asst. director of research.

Inland Steel Co.—J. B. Klukkert, named superintendent, Indiana Harbor Works foundry; D. M. Curtin, named sales representative, Denver office.

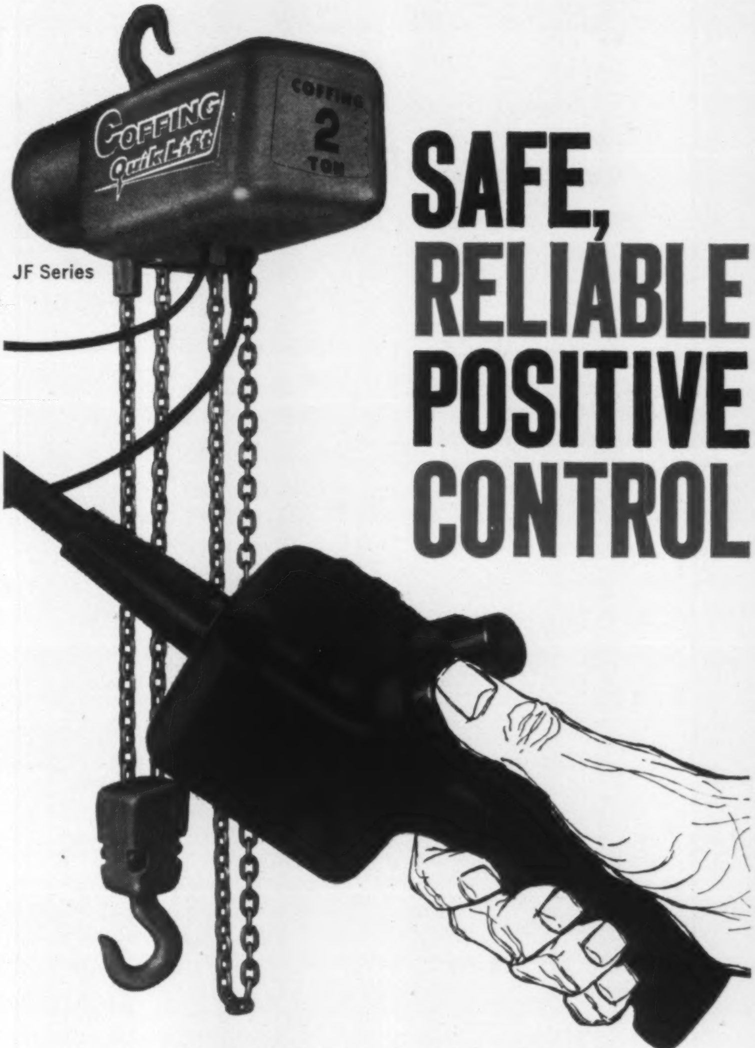
Basic Inc. — C. R. Heilig, appointed manager, furnace product sales; T. D. Hess, named central district sales manager.

Jomac Inc.—J. A. Gwin, named Midwest sales representative.

OBITUARIES

A. H. Tinnerman, 82, founder and board chairman, Tinnerman Products, Inc.

W. T. Adams, 61, vice president, Republic Steel Corp.



Convenience, positive control and protection for the operator are provided by the pistol-grip, push-button control station of the Coffing Quik-Lift electric hoist.

Loads can be raised or lowered while pulling a trolley mounted hoist since a strain cable is incorporated in the control cord. The control station is made of non-conducting, impact resistant plastic and the 115 volts at the station plus the interlocked push buttons make for safe operation. The V-type brake assures positive control of loads. Housing is of strong but light aluminum which makes for portability.

Ask your distributor about the twenty JF models with capacities ranging from ¼ to 2 tons or write for Bulletin ADH-65-CC.

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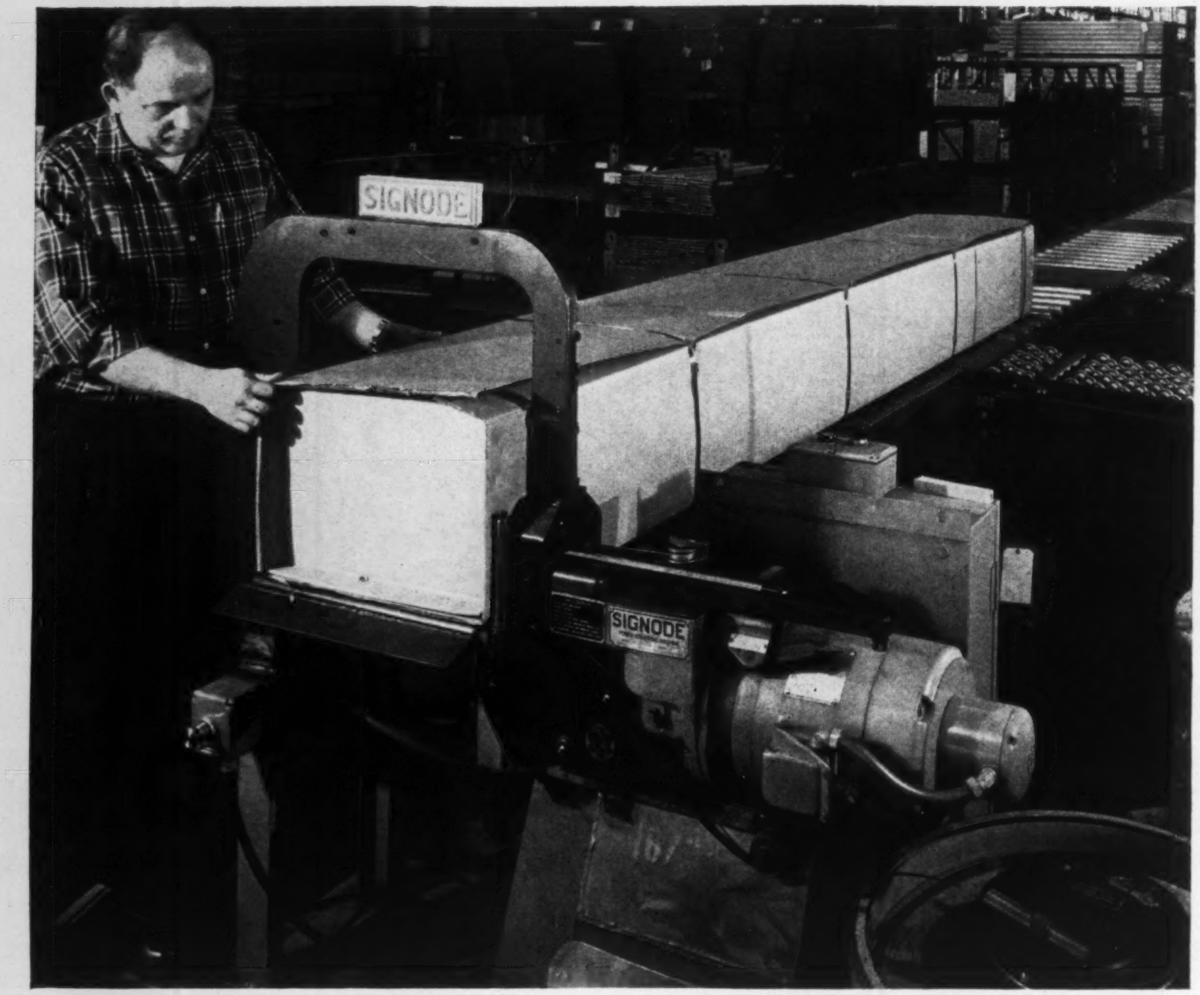
Ratchet • Screw
Hydraulic • Worm Gear



New Signode high-speed strapping machines

It's simple. The operator positions the package or bundle, steps on the foot switch, and the strapping is applied, sealed, and severed in seconds ...more than fast enough for the highest production rates.

New M-20 Series machines apply strapping smoothly, without impact, without denting or marring your product. They maintain uniform tension at any desired value between 50 and 1500 pounds.

Life tests and up to five years of industrial operation prove that M-20 machines complete half a million strapping operations before requiring more than routine maintenance.

Strap ends are joined mechanically with a metal seal that visibly insures a proper joint regardless of dirt, paint or oil. 3-HP motors insure against overloading even at maximum tension. Easy to use, easy to learn to use. Packages can move through the machine in either direction.

Each M-20 Model straps a wide range of mixed package sizes.

This new series of six standard M-20 machines is the result of 15 years of Signode experience in designing and building most of the power strapping machines now in use.

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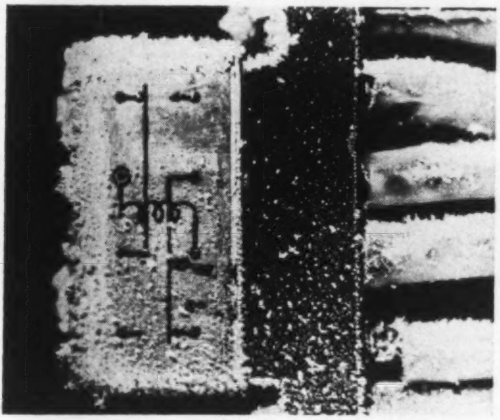
This half-size crystal relay is no larger than a dime. The relay is being subjected to extreme cold conditions which space vehicles encounter when they orbit in the earth's shadow. The Leach Corp. re-enacts the condition at –85° F. Relays help the U. S. astronauts actuate power-switching controls in Mercury capsules.



DOES THE JOB: In outer space.

Congress Rushes Action

Congress is hurrying to approve, before adjournment, a $48 million fund for weather satellites. The money covers only the U. S. Weather Bureau's share of the satellites. NASA will pay for other expenses. Present plans call for orbiting four more Tiros-III satellites and an advanced model of the Nimbus. The latter would go into polar orbit and turn its weather eye on the world.

Space Plans Get Scrutiny

U. S. space planners are now giving serious thought to putting huge space stations into orbit as stepping stones to the moon. James Webb, NASA administrator, says these stations could also be used as service stations for communications satellites. To build a station, Webb claims hundreds of present-day rockets would be used.

Automatic Inspector

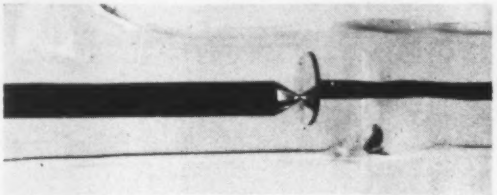
Newest wrinkle in our highly-automated environs is a machine which automatically inspects and verifies the dimensions of parts machined by numerical controls. The unit gets its data from a prepared tape which specifies the ordinates of a part's contour. The part is oriented to the reference planes in which it was produced. This method of inspection could register a 70-pct saving in inspection manhours. First duty is slated for Northrop's T-38 supersonic-jet trainer.

Drills 90 Holes a Minute

A new high-speed drill is opening 90 pin-size holes per minute in what is probably the most unusual airplane in history. The goal: 1,800,000 holes, spaced ¼ in. apart. The holes will help apply Northrop's air-inhaling principle to the WB-66D test aircraft. The drilling torque is measured electronically and held at a constant level. As the drill becomes dull or hits varying material hardness, the speed and feed are regulated automatically. A drill break will stop the machine. Prime use is on ½ in. Al honeycomb.

Checks Space Vacuum

Metal evaporization studies show that whole sections of space ships could disappear during an extended voyage if the wrong metal is used. At a vacuum of 10^{-9} mm Hg, odd pits form on the metal's surface. Also, bare atoms contact one another causing "cold welding" of metals. The tests bring to light a host of new problems facing spacecraft designers.



COLD WELDING: Steel rod under vacuum.

Pocket-Size Computer

Look for the fabrication of airborne-type pocket-size electronic computers weighing about 1 lb and occupying about 0.02 cu ft—less than a cigarette pack. Thin film research is paving the way. Evaporation of metals through photographically-formed masks can create many thin-film circuits in a small area. The thickest films are about 0.001 mm. Chief benefit is high reliability.

Application tested! Proved!

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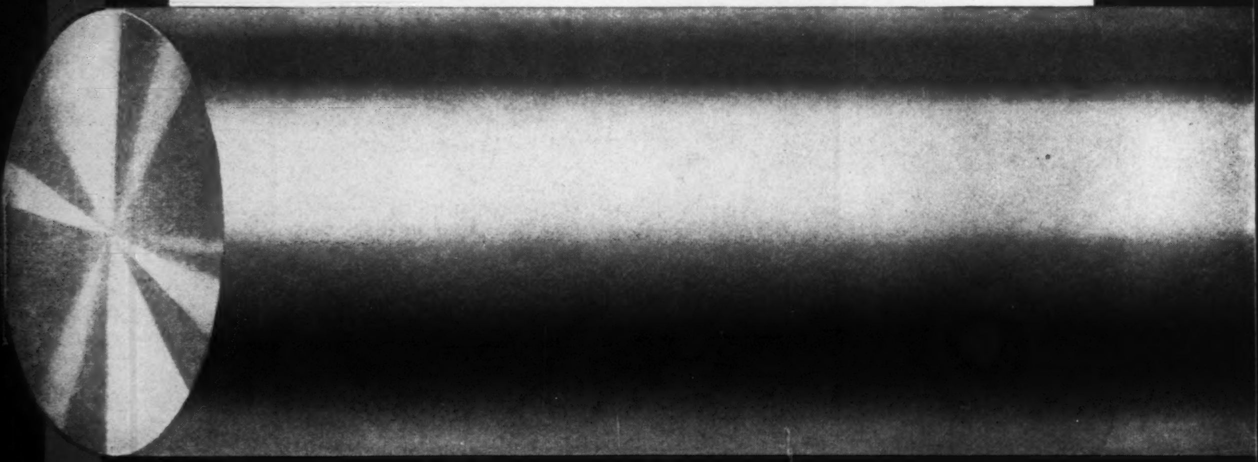

Here are cost-reducing advantages

(1) Heat treating problems, costs (and secondary operations) are eliminated. (2) "e.t.d." 150 machines better than heat treated in-the-bar alloy steels. (3) Tool life and finish are excellent. (4) No quench cracks or distortion from heat treatment. (5) "e.t.d." 150 has exceptional strength and hardness uniformity across the bar. (6) End cost of parts is greatly reduced.

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Take Guesswork Out of Forming

Air Force Report Shows How to Predict Sheet-Metal Formability

Forming sheet metal can be a hit-or-miss affair. It may take several, costly trial attempts to set up properly for forming.

A new analytical approach dissects twelve forming processes to show how it can be done right—the first time.

▪ The long-awaited final report on "theoretical formability" is now complete. A paper on this subject was delivered last week in Phoenix at the materials symposium of the Aeronautical Systems Div., Air Force Systems Command. From all signs, it may mark a milestone in metalworking.

The theory that there is a relationship between a material's mechanical properties and its forming limits has been proved, thus making it possible to predict the formability limits of any sheet material.

The significance of this concept is that fabricators need no longer resort to cut-and-try methods of determining sheet-metal formability.

By the use of pre-determined graphs and design tables, geometrical limits of a particular part for any selected sheet metal can be identified and a good part formed the first time.

Typical Problem—Consider this problem. Suppose the job calls for brake forming a ⅛-in. sheet of 17-7 PH. The bending angle is 90°. What punch radius should be used so that the part does not split?

Solving this type of problem is often a hit-or-miss affair. Now it can be handled by a purely analytical approach. Similar problems involving other processes for forming sheet metal can be so treated also.

To statistically verify the forming limit graphs, more than 21,000 parts were formed as part of an extensive test program. Materials tested include some of the most commonly used alloys in these categories: Magnesium; aluminum; titanium; stainless steel; tool steel; nickel and cobalt base; refractory metal.

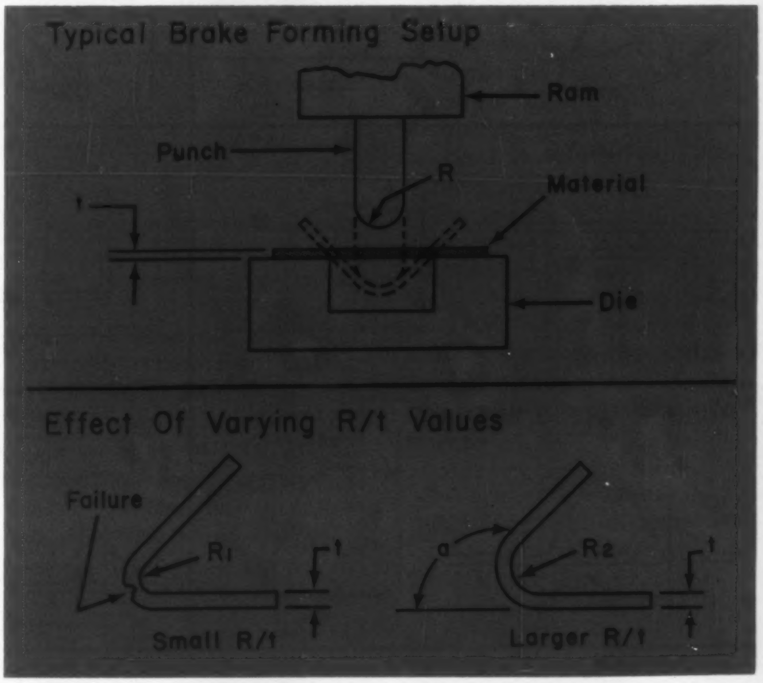
Most of the work in this Air Force sponsored project was done at Chance Vought Corp., Dallas. Project engineer was W. W. Wood of the manufacturing research and development group, Vought Aeronautics, under the program monitorship of directorate of materials and processes, headquarters, Aeronautical Systems Div.

To Predict Formability—Objective of the program: To develop a method for predicting formability of sheet material. Reason: To pare lead times, costs and other factors related by forming.

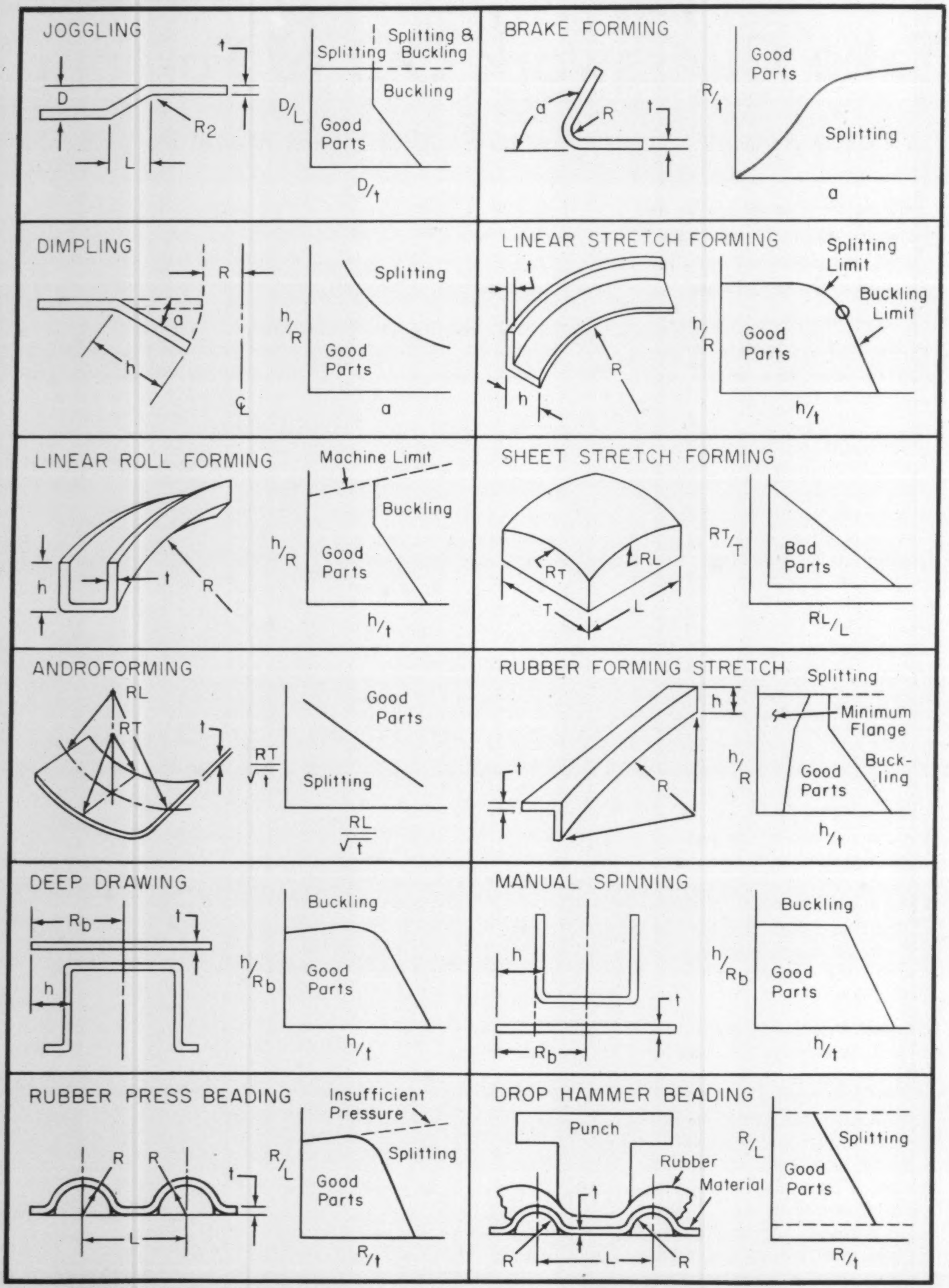
This objective has been accomplished for the twelve forming processes included in the contract, reports Mr. Wood. Included are: Brake forming; dimpling; drop hammer beading; rubber press beading; sheet stretch; androform; joggling; linear stretch; rubber stretch; rubber shrink; roll forming; spinning; deep drawing.

Shape Vs. Failure — What was the procedure used? First, equations which relate the shape of the part to the mode of failure

Where Problem Can Arise

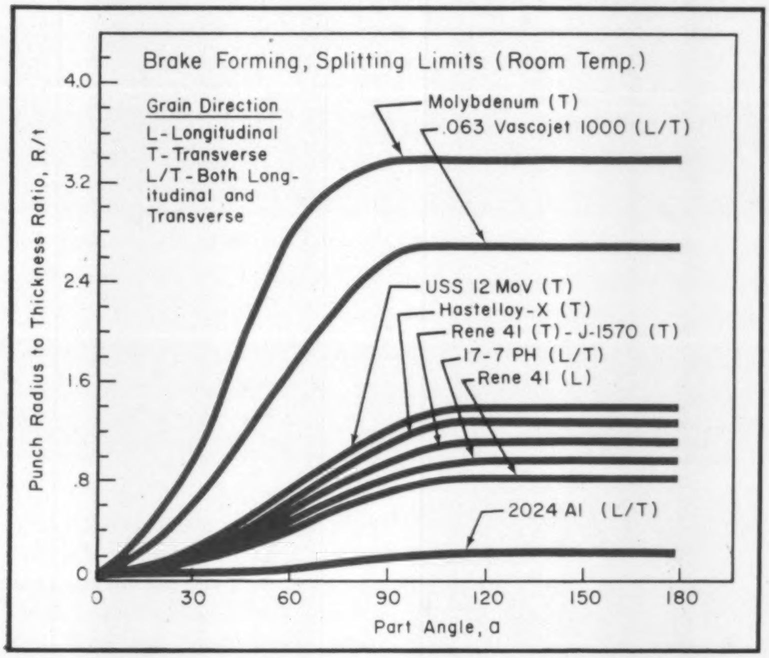


Formability Charts Pinpoint Failure Areas



FOLLOW THE CURVE: Typical formability charts tie in forming limits with part geometry.

How to Avoid Splitting



HOW TO FORM: Composite graph is full-scale version of small graph on opposite page. It gives punch radius for given bending angle and metal thickness. A radius under this value may cause splitting.

were defined. This was done for each process.

Next, formability indices were developed for each material based on mechanical properties obtained from tension and compression tests.

Combining the two enabled the manufacturing research team at Chance-Vought to come up with graphs from which the desired forming variable can be selected.

Brake Forming—Let's take brake forming as an example. Brake forming is the most simple type forming operation. It's widely used for forming flat sheets into sections such as angles and channels.

The diagram shows a typical brake-forming setup. During forming, the ram forces the punch and workpiece into the die cavity. In all angle bends, the workpiece is supported only at its outer edges so that the length of stroke of the ram determines the part angle, "a." The metal is so bent that the inside radius of the workpiece is the same as the punch radius.

Geometric variables for brake forming are punch radius, "R," material thickness, "t" and part angle, "a." Varying these parameters gives either good parts or failures.

Avoid Sharp Bends—Failure of a bent part occurs when the bend becomes too sharp—small radius to material thickness for a given part angle. Therefore, a relationship exists between the tension in the outer fibers of the part (bend angle) and the R/t of the workpiece.

This relationship can be expressed by certain equations. Then by pulling a tensile-test specimen and measuring the strain, the R/t value can be found for any selected part angle. These data are then used to plot a graph showing the splitting limits.

The graph shows splitting limits for brake forming of a number of alloys. Actually, the theoretical-formability report covers a total of nineteen metals used by the aircraft industry.

How Graphs Help—With this graph, it is possible to select an R/t value for an angle, "a." Then, by knowing the material thickness, "t," the correct punch radius, "R," can be calculated. Hundreds of similar calculations have already been worked out and tabulated in design table form for ready use by designers and manufacturing personnel.

The chart on the preceding page summarizes the general shape of the graphs for the twelve forming processes studied, and the variables involved.

What's Next?—This study on theoretical formability has brought to light a number of other areas where forming studies are needed, points out Mr. W. W. Wood of Chance Vought Corp.

It's been shown, for example, that springback depends on the same mechanical properties as buckling. When more data are obtained, the designer will be able to design springback into the forming tools.

Thinning Needs Review—Reduction of thickness of a metal part during forming is another consideration that should be predicted for efficient design. Thinning usually accompanies parts that have undergone stretching during forming; thickening occurs on parts that have been compressed.

Graphs and tables could be prepared for all shapes to give the designer a ready reference for thickness changes in parts during forming.

The concept of theoretical formability might also be used in basic alloy development according to Mr. Wood. With a knowledge of the properties needed for good formability, alloy developers can come up with optimum formable materials, rather than putting the entire emphasis on high strength.

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Can Equipment Rental Pay Off?

By **H. A. Warren**—General Mgr., Clark Rental Corp., New York

Materials-handling equipment is relatively inexpensive. Why not purchase it outright?

There are sound reasons why renting offers advantages—even for low-cost shop items.

- Is renting the best way to obtain modern machine tools and materials-handling equipment? More and more frequently, top management asks purchasing to evaluate long-term rentals.

The men who hold a company's purse strings ask some pretty basic questions. What's the main advantage in renting? Will we save money by renting rather than buying equipment outright?

How much can we save? And how can we determine in advance just what the savings will be?

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READY TO ROLL: Rented trucks take snags out of seasonal peaks.

Rent or Lease? — Another big question centers on a comparison between renting and leasing. Top management wants to know: How does renting differ from leasing? Which of these two equipment-use systems will serve our company's financial needs?

Let's clear the fog that surrounds equipment rental. The answers to management's questions yield a clear picture of what rental is. They also show how equipment rental can be used and why it's worthwhile.

First, we'll end the confusion between leasing and renting. Too often, these terms have been used interchangeably. Sometimes, they're even used erroneously in transactions which are nothing more than conditional-sales agreements.

From legal and tax-advantage viewpoints, there isn't very much difference between a true-leasing contract and a rental contract.

Maintenance—However, from a practical viewpoint, there's one important difference. Who does the maintenance? In a rental contract, the lessor (equipment owner) takes care of all maintenance and servicing. The user or lessee is completely free of all maintenance responsibility.

In a leasing contract, as a rule, the user assumes the problems of maintenance. This means he's in the same boat as if he had bought the equipment outright.

Leased equipment normally carries the standard factory-service and warranty provisions. Factory representatives are available to lease holders on the same basis as to outright purchasers—during the warranty period. If the lessee calls for factory service after the warranty expires, he has to foot the bill for this work.

Stretch the Dollar—Current in-

BRODIE INDUSTRIAL TRUCKS INC
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TIP-TOP SHAPE: Experts service the rented equipment at all times. You don't have to stock repair parts.

terest in long-term rental is quite high. During the last two years, the Clark Rental Corp., originally a subsidiary of the Clark Equipment Co., has written rental contracts with a total value of $5 million.

What sparked this interest in rental? The answer is twofold. As an aftermath of the 1958 recession, management faced many demands for its working capital. Looking for a way to stretch the dollar, management found that the renting of comparatively low-cost items such as handling equipment frees capital for other investment areas.

Also, management found that dealing with a rental company has certain inherent advantages. The rental company is a specialist in its field. It has volume purchasing power, backed up by highly-trained service crews. Thus, it can do an efficient job of providing and maintaining up-to-date equipment.

Keep Your Cash — Let's study equipment rental from another angle. Capital is needed to prime the profit pump. It's capital that starts the cycle of cash to raw materials to work-in-process to accounts receivable, back to cash (and profits) again. Final profits hinge on capital-turnover frequency.

Why tie up your capital in equipment which can be rented? Remember, use—not ownership—dictates the profit potential of shop equipment.

With these thoughts in mind, we'll study a sound rental program. A true long-term rental plan has several important characteristics.

It stipulates that all maintenance, servicing, replacement and insurance obligations are assumed by the owner. Emphasis is placed on equipment utility. Preventive maintenance makes downtime almost nil.

Flexible Rates—Rental rates are fixed by formulas and standards. Past experience, not hit-or-miss methods, is used to develop flexible rates. These rates are tailored to suit each customer's operations. This requires a thorough survey to maintain appropriate data.

In some rental programs, provisions are made for the lessor to buy a customer's existing equipment at its fair market value. In other cases, the rental company buys the equipment, rebuilds it, then rents it back to the customer.

Whenever possible, rental rates are quoted on a one-price basis. In seasonal applications, or those which have varying hours of operation, overtime provisions are usually written into the contracts.

Satisfy Tax People — The final contract should be written as a true rental plan. As such, the Internal Revenue Dept. allows the rental payments to be deducted as operating expenses. Any plan that doesn't contain all of the preceding points should be viewed with caution.

Now, with this understanding of a sound rental program, we'll study some rental bonuses. All maintenance and service responsibilities are dropped in the lessor's lap. The user doesn't need to keep stock and service records. Plant space normally needed for servicing and spare-parts inventories remains open for more profitable use.

Equipment doesn't sit around idle. You only rent enough machines to handle average annual requirements. In emergencies or during seasonal peaks, the lessor provides additional equipment at special rates.

What about hidden costs? As mentioned before, insurance and other hidden extras are borne by the lessor. With a one-price rental contract, you know your materials-handling equipment costs in advance. This lets you budget overall expenses more accurately.

How to Get Full-Dollar Value In Drilling Carbon Steels

Are finished products floating out of your shop on a sea of discarded drill bits?

Why not take the bull by the horns and stop this waste? British test data tell how.

▪ Everyone knows how to drill holes in carbon steels. At least most people think they know enough about this common work. But can you honestly say you're getting optimum results?

You're probably content with present hole sizes and tolerances. If not, you've already got unhappy customers on your back.

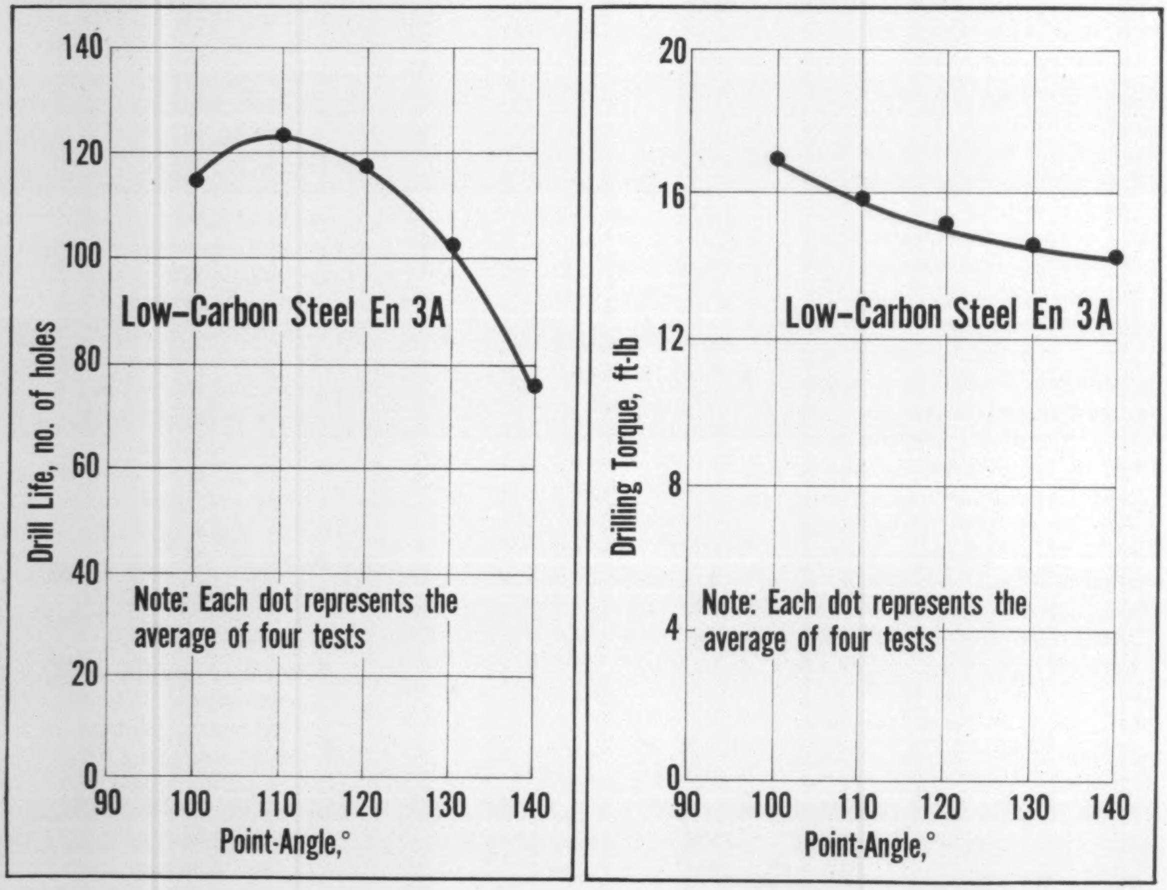
Extend Drill Life—Are you also happy with present drill life? How many holes are being drilled in your shop between tool-grinding cycles? Even if you think your present methods are up to snuff, you still may be missing a chance for major savings.

Drill bits cost money. In compiling overall costs, don't forget

Check Typical Analyses

Element	Steel En 3A Pct	Steel En 10 Pct
C	0.20	0.55
Si	0.25	0.22
S	0.045	0.042
P	0.028	0.04
Mg	0.75	0.60
Ni	0.065	0.75
Cr	0.08	0.05

Point Angle Affects Drill Life and Torque



to include regrinding expenses. By maintaining proper point and relief angles you can extend a drill's life. Regrinding costs will also tumble.

Extensive drilling tests have been carried out on low- and high-carbon steels. These tests, conducted by the Production Engineering Research Association (PERA) of Great Britain, pinpoint the effects of various drill-point and relief angles.

Test Conditions—Two types of carbon steel were drilled in these tests. Typical chemical compositions appear in table form.

Heat treatments for these test blocks were as follows:

Steel En 3A: Normalized at 900°C, removed after 5 hours and allowed to cool in air.
Steel En 10: Annealed at 820°C for 3 hours, furnace cooled to 650°C and withdrawn.

Every test block was drilled under closely-controlled conditions. In fact, even the test drills were made from a single bar of high-speed steel. Diluted soluble-oil cutting fluid cooled these ⅝-in. diam tapered-shank twist drills.

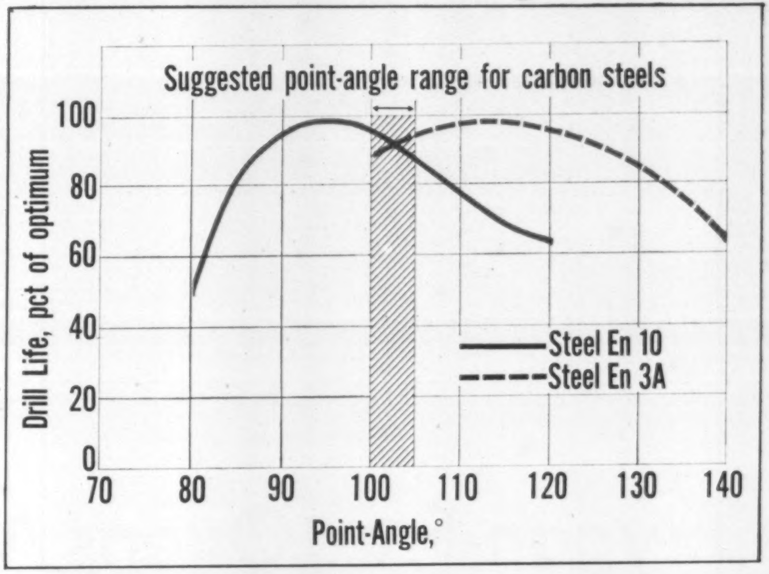
Metered Oil Flow—A ring-type distributor fed the cutting oil to the drills at a rate of 6 gpm. The cutting oil's supply tank had a heating element with a built-in thermometer. Controlled heat held the oil temperature constant at 24°C, ±1°.

Each test drill was ground to a different point shape. Then the total number of drilled holes obtained before drill failure was recorded. Drilling-torque and thrust values were also continuously recorded throughout every test.

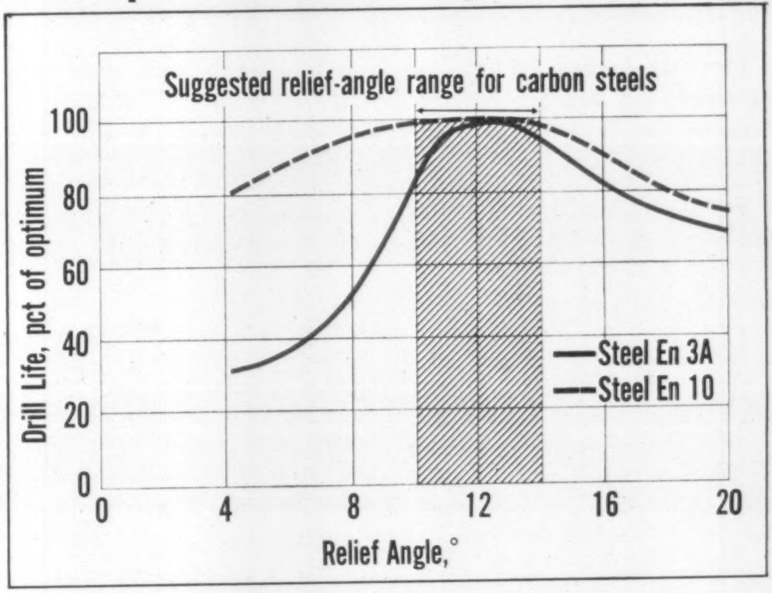
Separate tests helped to gage the effects of various relief angles on optimum drill life. These tests were conducted with 4°, 8°, 12°, 16° and 20° relief angles.

A drill was considered to have failed when any part of its cutting or chisel edge began to collapse.

Note Best Point-Angle Range



Proper Relief Angles Pay Off

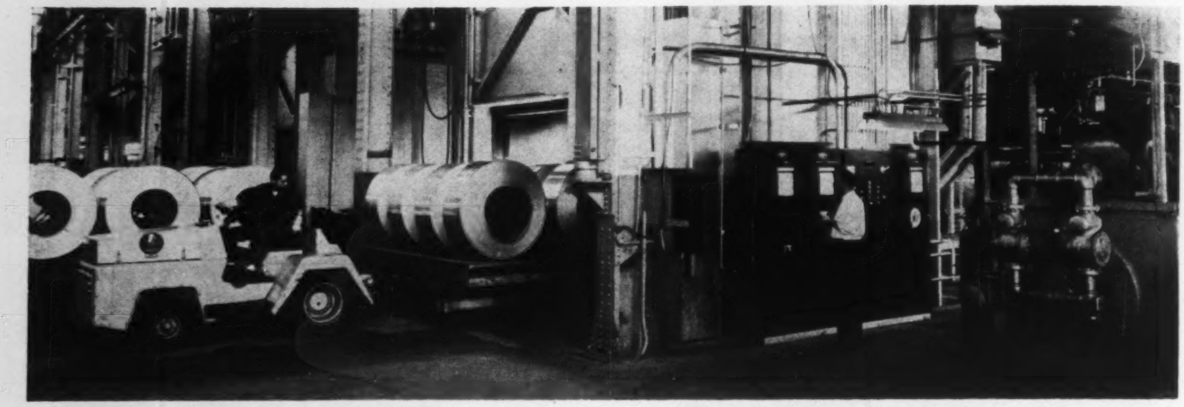


Check Results—At the completion of each test, average torque and thrust values were obtained from dynamometer charts. Let's check out a few of these test results.

In drilling the steel En 3A blocks. drill life soars as point angles are stepped up from 100°-110°. However, drill life tumbles as the point angles continue to increase.

Drill-life and drilling-torque results—for individual drills that were ground to various point angles—appear in three simple charts. One of these charts pins down an optimum point-angle range of 100°-105° for both carbon steels.

The last chart shows how important a role relief angles play in maintaining drill life. You'll note that with both types of steel a 12° relief angle yields top results.



STAIN-FREE SHEET: Annealing aluminum in an oxygen-free atmosphere ends stain and oxidation problems. Even when full annealing isn't called for, stress relieving is done in an endothermic atmosphere.

Oxygen-Free Ovens Anneal Coils

Quick Heating and Cooling Rates Speed Aluminum Mill's Output

The time needed to process aluminum coil depends for the most part on the long, last step —annealing.

Bridgeport Brass speeds up its annealing cycle by using medium-sized ovens with accelerated heating and cooling rates.

▪ Annealing ovens represent one of the largest dollar outlays in aluminum sheet production—and for a good reason. Annealing directly affects surface-finish quality. Also, annealing time is the big bind in the sheet-production cycle.

However fast the rolling mills and slitters, annealing can take longer than three shifts. The average order makes at least one trip to the ovens, often two. One answer is bigger ovens to handle more coils at one time.

Another Choice — Bridgeport Brass Co., Warren, O., took an alternate route: medium-size ovens with high heating and cooling rates, all designed for oxygen-free annealing. The oxygen runs less than 0.5 pct. This means the company's new mill can handle both large and small orders without snarling the plant schedule.

Designed by W. S. Rockwell Co., Fairfield, Conn., each hot-car type oven holds an 11 x 12 ft tray with a 30,000 lb capacity. The ovens can be used for annealing, temper annealing or stabilizing of non heat treatable alloys.

Ovens are built for possible relocation within the plant, since their floors rest on structural steel beams. Off-the-floor construction also cuts down on condensation corrosion under the furnace.

Special Seal — The vertical-lift type doors are motor operated. A pneumatic locking device provides the necessary gas-tight seal by wedging the door against the oven seal. The seals are water-cooled sponge rubber shapes mounted in the oven shell.

Eight 6-in. diam radiant tubes, set in the walls, produce a total heat input of 6 million Btu per hour. This cuts annealing time almost in half. Faster heating also improves the metal's grain size.

Complementing the high-heat rate is the oven's large cooling capacity—2 million Btu per hour. Rapid cooling allows faster turnover. The cooling system is externally located with supply and return ducts to the oven chamber. A 15,000 cfh fan pulls the atmosphere from the oven, passes it over fin-type water-cooled coils and returns it to a supply duct atop the oven.

Holds Oxygen Down — Atmosphere for the ovens is supplied by two 15,000-cfh exothermic generators. The oxygen level is held to less than 0.5 pct by an automatic analyzer and recorder.

Each oven can handle twelve 250-lb coils in 12 hours. The cycle is divided into three stages. First, the oven is purged for one hour at 350°F. Then the load's given a full anneal at 775°F for seven hours. The last four hours are used to cool the load back to 350°F.

Temper annealing takes less time. Here, only a one-hour purge is needed. Burners start up when the atmosphere reaches an oxygen content of 2 pct.

Prism Gages Fast Heat Changes

Do you have to detect quick heat changes at temperatures ranging from 1000°-3000°C?

A new three-color pyrometer provides up to 60,000 temperature readings every minute.

▪ Capable of making 1000 temperature checks per second in the 1000°-3000°C range, a new pyrometer uses three distinct wave lengths. The accuracy of this three-color pyrometer, developed by G. A. Hornbeck of the National Bureau of Standards, is within one percent.

Here's how the new instrument operates. It forms a spectrum of the radiation emitted by the source under study. Then it masks out all but three desired wave lengths.

Easily-Read Signals—In a fixed sequence, these wave lengths feed into a detector. Oscilloscopes, magnetic tapes or other high-speed recording devices can be employed to read the wave-length signals.

The newcomer eliminates bottlenecks which are inherent in one- and two-color pyrometers. With one-color pyrometers you have to know the spectral emissivities of all the materials that are being observed. If you can't pin down these data you won't be able to convert brightness readings to true-temperature values.

To avoid having to establish absolute emissivity data, some people use a two-color or ratio-type pyrometer. But again another limitation crops up.

With a two-color pyrometer, the emissivities at both wave lengths must be identical. Unfortunately, this isn't always the way things work out in actual practice.

Linear Values—On the other hand, true snag-free temperature readings are insured by adapting three-color pyrometry. Of course, all emissivities must be handled as a linear function of the selected wave lengths.

This criterion presents no headaches in the near-infrared region of the spectrum. Thus, Mr. Hornbeck decided to pinpoint temperatures by gaging emissive intensities at three different wave lengths. This decision led to the new three-color pyrometer.

This instrument uses a unique system to separate and measure the three discrete wave lengths. Radiation from the source of interest passes through an entrance slit. This radiation is rendered parallel by a collimating mirror.

Next, the beam passes through a prism to a second mirror which brings the prism-formed spectrum into focus. A major feature of this optical system centers on a right-angle mirror that's placed in the vertical plane of the spectral image.

Signal Chopper—Reflection from the right-angle mirror displaces the image vertically. In essence, the image retraces its path through the optical system. Then a mirror placed near the entrance slit reflects the beam to a radiation detector.

A mask, placed in the path of the beam coming from the right-angle mirror, passes the selective wave lengths to a slotted chopper. The chopper, in turn, feeds sequential exposures to the detector's tube.

Since the sensitivity of most fast-radiation detectors depends on the selected wave lengths, a calibration device is a must. Mr. Hornbeck built rapid calibration into his pyrometer.

Adjustable attenuating pins are placed in the color-band pass for each wave length. These pins are set to pass metered amounts of radiation at the time of calibration.

HIGH-SPEED PYROMETER: Optical system reflects three wave lengths.

How to Select Geared Drives

By F. L. Reed, Engineer, Westinghouse Electric Corp., East Pittsburgh

Gears are well known and well-established components. Yet, the endless number of types must be overwhelming when it comes time to choosing one.

These tips may prove helpful when selecting geared drives.

BUILDING BLOCKS: The modular approach permits the assembly of geared drives in a matter of hours. This unit is used in asphalt production.

- Only one motor out of five can be used by itself. The other four need some type of speed-changing equipment to convert the motor speed to suit the drive needs.

One of the most efficient and most common is through the use of gearing.

Many Ideas—There are probably more ideas about the use of gears than almost any other machine component. Gearing configurations seem almost endless. Floor, wall or ceiling-mounted units; concentric, parallel or right-angle shaft arrangements; single, double, triple- or quadruple-gear trains are just a few of the common types. When these fail to solve the problem, an endless supply of special designs can be built.

Calculate Overhung Load

$$W_t = \frac{63{,}000 \times P \times SF}{N \times R_p} = \frac{T}{R_p}$$

W_t = Tangential force or overhang load, lb

P = Transmitted horsepower

N = Speed of output shaft, rpm

R_p = Pitch radius of pulley, sprocket, or pinion

T = Torque at output shaft, lb-in.

SF = Service factor

The modular concept, using just a few basic building blocks, removes the complexity of gearing. It also adds versatility. Making gearing by this concept permits the making of a limited number of parts to fill a broad area of needs. With these parts in stock, a unit of any description can be assembled and delivered in a matter of hours if need be.

With this new approach, mass production of functional components can be achieved. Gears ground to a tolerance of 0.0002 in. —master gear specifications—are now standard. Result: Units that run quieter; require less maintenance; operate more efficiently; have longer life. Yet, they cost no more.

Splines vs. Keys—To ease assembly of these mass-produced units, splines rather than keys are used. Then, when the gears need to be replaced to obtain a different ratio, the old gears are slipped off the shaft and new ones are easily inserted.

For intelligent selections of gearing, it's vital to know some of the basic types of gear drives. The table lists them and their key features.

Standard Speeds—When selecting a speed, it's wise to choose a standard one. There are several reasons. Gearing is more readily available; standard gearing usually permits a simple and economical change in speed; there's no extra cost.

The American Gear Manufacturers Association (AGMA) publishes a list of standard output speeds. But because of motor slip and design tolerances, actual output speeds may vary as much as 3 pct from these values. Many intermediate speeds may also be obtained—usually at extra cost.

It's interesting to know that standard speeds are based on a multiple of 1.125. Thus, dividing any listed output speed by this factor gives the next approximate lower output speed.

What Is the Load?—When selecting geared drives, it's essential to establish the load requirements of the driven equipment. The needed horsepower may be based on oscillograph or wattmeter readings of similar equipment; it may be closely estimated from past experience or performance data.

Work to be done by the gearmotor can be segregated into three steps: Overcoming friction in the driven equipment; performing the actual operation; overcoming inertial forces.

Having determined the load requirements, it's still not possible to establish the final unit size. The duty cycle involved and the time of operation must be taken into account to establish the proper service class.

Check the Class — For gearmotors, AGMA has established three service classifications:

Class I—Normal loads; steady 8 hours/day service. Moderate shock loads where service is intermittent.

Class II—Normal loads at steady 24 hours/day service. Moderate shock loads for 8 hours/day.

Class III—Moderate shock loads for 24 hours/day. Heavy shock loads for 8 hours/day.

For most jobs, the durability rating of a set of gears determines the allowable load. However, there are a few applications, such as for various types of hoists, where gears operate infrequently or there are comparatively long periods of shutdown between each operation.

In these cases, durability rating becomes secondary. Instead, gearing should be selected on a peak torque or strength basis. Since such applications take special planning, it's usually best to refer them to the gear maker's representative for recommendations.

Overhung Loads — Too often, gears are selected with respect to matching the load and service needs but with little or no regard to the overhung load that may be imposed on the output shaft.

Various factors may influence the intensity of an overhung load: Method of power takeoff (chain, V-belt, flat belt, pinion): pitch diameter of sprocket, pulley or pinion; output speed of the gear unit.

If the information covering the foregoing points is available, the overhung load may be calculated by the formula shown in the first page.

The value, W_t must be multiplied by one of the following factors to arrive at the imposed overhung load on the output shaft: Chain-1.0; V-belt-1.5; flat belt-2.0; pinion-1.25.

Catalogue Lists Limits—By referring to a catalogue, you can determine whether or not the calculated overhung load is within the permissible limits of the gear unit selected. These permissible values are usually listed by horsepower and output speed.

Because they have bridged the gap in mechanical power transmission, geared drives are gaining more applications in the steel industry. With modular type construction, many economically feasible variations are now possible.

What Are the Basic Drives?

Gearmotor:

One of the most common gear drives. It consists of a motor and flange mounted directly on the gear housing.

Advantages: Compactness, rigidity of component alignment, single-source responsibility, low cost.

Capacities are from 1-75 hp.

Output speeds range from 1.8-420 rpm.

Package Motor Reducer:

Motor is mounted on a support bracket which is attached to the gear case. Standard coupling connects motor to gear train. Costs slightly more than gearmotor.

Advantages: Interchangeability; ease of replacement or maintenance.

Capacities are from 1-125 hp.

Output speeds range from 1.8-420 rpm.

Separate Speed Reducer:

For use when the motor is not to be mounted on the gear unit. It can be obtained separately or in a package.

Capacities are from 1-4000 rpm.

Gear ratios are from 1.84-291.7:1.

Shaft-Mounted Speed Reducers:

Shaft mount has hollow shaft which fits directly on driven shaft. Reducer is then belted to driving motor by means of sheaves.

Advantages: Low cost; wide range of speeds; compactness; no floor space or foundation is needed.

Motorcylinders:

Gearmotors which produce reciprocating motion.

Advantages: High torque; high slip; easy installation and maintenance; rapid accelerating and braking action.

Submerged Arc Joins Aluminum

New Technique Makes Ductile Joints in Thick Plate

It's hard to weld thick aluminum plate. But you may have the right equipment on hand.

Why not convert this welding equipment to make it suitable for a new welding process?

▪ A new method for welding thick aluminum plate has been developed by the Kaiser Aluminum & Chemical Corp., Oakland, Calif. This new welding technique centers on the use of large-diameter filler wires.

P. P. Zeigler, Kaiser's director of metallurgical research, states: "With this new method, welding costs are drastically reduced because weld-filler deposit rates of 15 lb per hour are readily obtained."

High Output—For special applications, the new welding technique can even be extended to yield more than 20 lb of weldment per hour. Conventional gas-shielded metal arcwelding setups deposit only 5-10 lb of weld filler per hour.

What about suitable welding equipment? You don't have to buy special machinery. With simple modifications, a submerged arc-welder can be adapted to the new welding technique. This arcwelding equipment is commonly used throughout the country for welding steel.

Using large-diameter filler wires, butt welds have been made in 3-in. thick aluminum-alloy plates. This work was done on alloy types 5083 and 5456. Mechanical properties of these butt welds meet ASME boiler and pressure vessel codes.

Other properties of the weldments prove even more noteworthy. An increase in the ductility of the welded joints is of paramount importance. Designers are favorably impressed by this ductility factor.

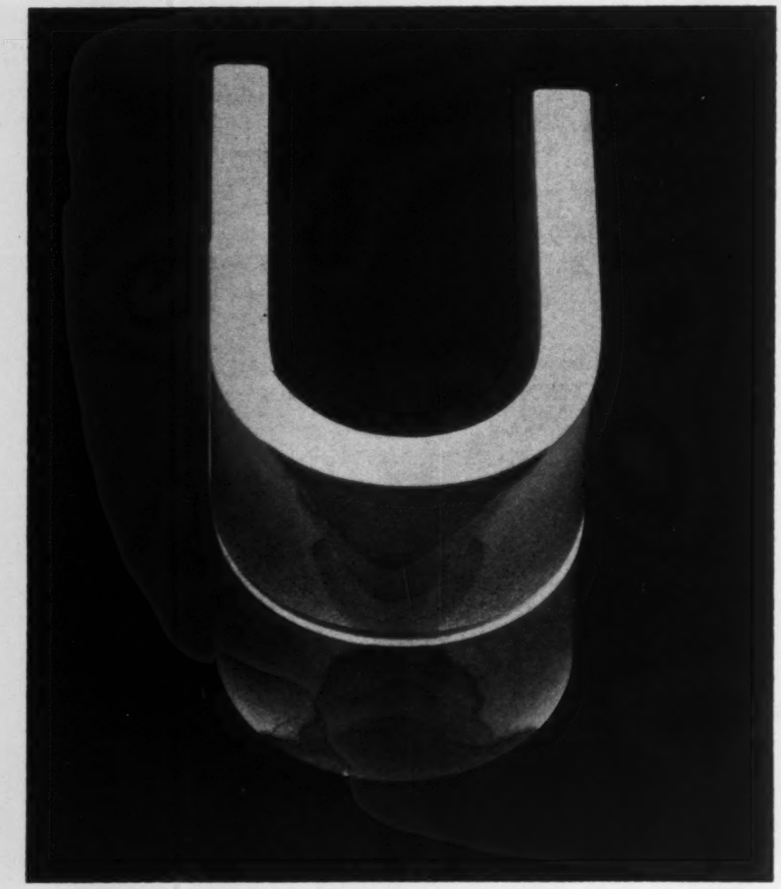
Fillets Too—However, butt welds don't tell the whole story. Procedures have also been set up for making fillet welds.

Let's get to the heart of the new welding process. Filler wires in diameters up to 7/32 in. are the secret behind the joining of thick aluminum plates. By contrast, in the normal Mig welding of aluminum, filler-wire sizes are limited to ⅛-in. diam.

Large-diameter fillers require heavy wire feeders. High-capacity power supplies are another must with the new technique. Most of the submerged-arc equipment used in the steel industry can handle these large aluminum-welding wires.

Conversion—How can you convert standard equipment to aluminum use? First, you've got to replace the flux and contact-tube system with a water-cooled inert-gas welding barrel.

The large filler wires used with the new process dictate a much lower current density. It should range from 15,000-30,000 amp per sq in. Conventional welders with small filler wires operate at 50,000-100,000 amp per sq in.



NO CRACKS: Both halves of a single side bend withstand 180° forming. Weld beads in this 3-in. thick aluminum plate consist of 5183 filler.

Acme-Newport

IT'S AS IF YOU DID THE SCHEDULING

. . . WHEN YOU ASK FOR RED CIRCLE SERVICE

You can get inventory replacement in a matter of days by requesting *Red Circle Service* from Acme-Newport, where flexibility of operation permits immediate scheduling. Onto your order goes a bright red circle that flags everyone's attention and gives you preferential handling all the way. Employees have the training and the will to make quality steel to exact specification. And the mill's modern facilities and methods provide the tools for both highest quality and prompt delivery. So when you need the best steel in the least time, ask for *Red Circle Service!*

Steel

PRODUCTS OF ACME-NEWPORT STEEL

Hot Rolled Steel in Coil
Hot Rolled Pickled Steel in Coil
Hot Rolled Sheets
Hot Rolled Pickled Sheets
Cold Rolled Steel in Coil (*full hard only*)
Cold Rolled Sheets
Alloy Sheets and Plates
Plates ($\frac{5}{16}$" *and lighter*)
Electrical Sheets
Electric Weld Line Pipe
Spiral Welded Pipe

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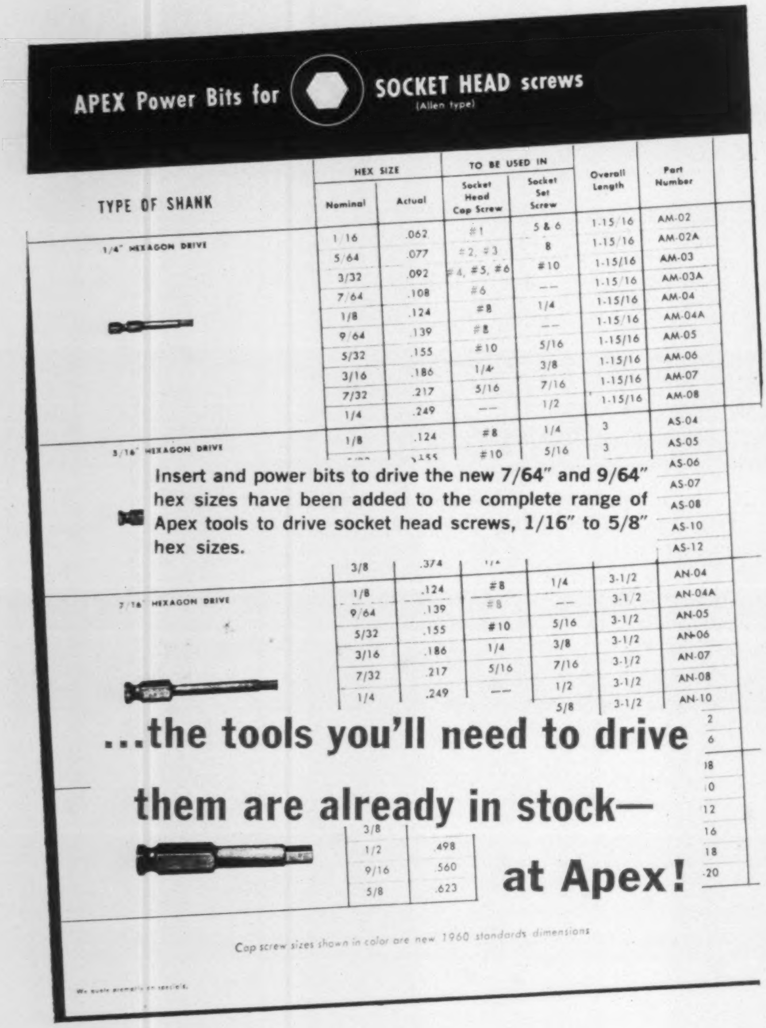
if you're thinking of using

the newest screw-type fasteners...



APEX Power Bits for SOCKET HEAD screws (Allen type)

TYPE OF SHANK	HEX SIZE		TO BE USED IN		Overall Length	Part Number
	Nominal	Actual	Socket Head Cap Screw	Socket Set Screw		
1/4" HEXAGON DRIVE	1/16	.062	#1	5 & 6	1-15/16	AM-02
	5/64	.077	#2, #3	8	1-15/16	AM-02A
	3/32	.092	#4, #5, #6	#10	1-15/16	AM-03
	7/64	.108	#6	—	1-15/16	AM-03A
	1/8	.124	#8	1/4	1-15/16	AM-04
	9/64	.139	#8	—	1-15/16	AM-04A
	5/32	.155	#10	5/16	1-15/16	AM-05
	3/16	.186	1/4	3/8	1-15/16	AM-06
	7/32	.217	5/16	7/16	1-15/16	AM-07
	1/4	.249	—	1/2	1-15/16	AM-08
5/16" HEXAGON DRIVE	1/8	.124	#8	1/4	3	AS-04
	[illegible]	.155	#10	5/16	3	AS-05
						AS-06
						AS-07
						AS-08
						AS-10
	3/8	.374	[illegible]			AS-12
7/16" HEXAGON DRIVE	1/8	.124	#8	1/4	3-1/2	AN-04
	9/64	.139	#8	—	3-1/2	AN-04A
	5/32	.155	#10	5/16	3-1/2	AN-05
	3/16	.186	1/4	3/8	3-1/2	AN-06
	7/32	.217	5/16	7/16	3-1/2	AN-07
	1/4	.249	—	1/2	3-1/2	AN-08
				5/8	3-1/2	AN-10
	3/8					
	1/2	.498				
	9/16	.560				
	5/8	.623				

Cap screw sizes shown in color are new 1960 standards dimensions

Insert and power bits to drive the new 7/64" and 9/64" hex sizes have been added to the complete range of Apex tools to drive socket head screws, 1/16" to 5/8" hex sizes.

...the tools you'll need to drive them are already in stock—at Apex!

If you're driving thousands of screws a day, or just a few . . . if you use several types and sizes of screws or just one . . . Apex has the screwdriving tools to help you save time and money. All standard types and sizes in stock . . . specials get "special" attention! For complete information, write for your copy of the new Catalog 30-C.

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NEW PATENTS

Degasifying Technique

Method of vacuum degasifying molten steel by circulation, K. Matsuda (assigned to Yawata Iron & Steel Co., Ltd., Tokyo, Japan), Aug. 1, 1961. This method of continuously and rapidly vacuum-degasifying molten steel, uses no ladle elevating means nor heating means in the degasifying chamber. U. S. 2,994,602.

Making Iron Articles

Iron powder for making sintered-iron articles, F. Hansen, Aug. 1, 1961. In the production of sintered-iron articles, 6-35 pct of the iron powder is contacted with nitrogen at 300-450°C. Then this soft nitrided fraction is admixed with the remainder of the powder batch. The resulting articles have high resistance to wear and corrosion. U. S. 2,994,600.

Withstands High Heats

High-temperature alloys, R. F. Gill and C. S. Wukusick (assigned to General Electric Co.), Aug. 1, 1961. A high-temperature alloy having improved tensile, yield and creep-rupture strength consists of 40-80 pct Ni, 10-25 pct Cr, 0.25-5 pct Cb and/or Ta, 0.5-8 pct Mo and/or W, up to 0.75 pct Ti, 0.25-3 pct Al, up to 2 pct each of Mn and Si, up to 0.2 pct C, and the remainder Fe and incidental impurities. U. S. 2,994,605.

Cast-Iron Composition

Production and treatment of pearlitic-malleable cast iron, W. Rubel (assigned to Walter Overhoff, Velbert, Rhineland, Germany), Aug. 8, 1961. In a pearlitic-malleable cast-iron composition, the manganese content is maintained at less than 1.7 times the sulfur content. Titanium content is likewise kept at less than 1/5 the manganese content. U. S. 2,995,441.

Copies of U. S. Patents are available at 25¢ each from Commissioner of Patents, Washington 25, D. C.

New Catalogues And Bulletins

Money-saving products and services are described in the literature briefed here. For your copy, just circle the number on the free postcard.

To Choose a Coupling

Simple selection of quick-connect/disconnect couplings is a bit of a problem with almost 500,000 different combinations available to the coupling user. However, a new 62-page catalog offers simple methods for matching a particular coupling with a specific application. (Snap-Tite, Inc.)

For free copy circle No. 1 on postcard

How to Reduce Speed

This 24-page roundup serves as a handbook on single-reduction, right-angle, spiral-bevel-gear speed reducers of both horizontal and vertical design. Information includes: Formulas for gear speed-reducer selection; a load-characteristics guide for more than 160 applications; and step-by-step examples of reducer selection. (D. O. James Gear Mfg. Co.)

For free copy circle No. 2 on postcard

Adhesives for Foil

An eight-page, 6000-word report discusses the physics of foil bonding, including mechanical attachment and polar adhesion. It also treats on required adhesive properties and analysis of currently-used foil adhesives, including neoprene-casein, butadiene-styrene, nitrile latices, vinyl resins and acrylic polymers. (The Borden Chemical Co.)

For free copy circle No. 3 on postcard

Catalogs Chemicals

An eight-page catalog lists properties and various industrial uses of Magichemical coating, sealants and adhesives and Big M chemical products. An unusual feature is numerical listings that show at a glance which products have specialized uses in a wide variety of industrial fields. (Industrial Research Laboratory, Magichemical Co.)

For free copy circle No. 4 on postcard

Small, but Powerful

Miniature power tools and handpieces are the subjects dealt with in a new tool catalog. Four, basic, miniature power tools are described, as well as industry's largest selection of miniature handpieces for grinding, deburring, drilling, sanding, polishing, cutting, etc. (Foredom Electric Co., Inc.)

For free copy circle No. 5 on postcard

Temperature Unit

A new 12-page bulletin illustrates and describes a pneumatic-temperature transmitter. Also included are detailed specs, a rundown on operating principles, a table of temperature ranges, and data on related accessories. (The Foxboro Co.)

For free copy circle No. 6 on postcard

Chemical Equipment

Specially-engineered equipment for the chemical-process industries is briefly described in a new four-page bulletin. The brochure describes and illustrates such items as pressure filters, ion exchangers, demineralizers, water softeners, centrifugal pumps, heat exchangers and waste-treatment systems. (Industrial Filter & Pump Mfg. Co.)

For free copy circle No. 7 on postcard

Safety Catalog

An illustrated 20-page catalog covers personnel-protective equipment for welding and torch cutting. Sixty-eight photos and drawings show helmets, hand shields, goggles, safety glasses, safety hats and caps,

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Circle numbers for Free Technical Literature Design Digest, or New Equipment:

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face shields, portable screens, gloves and mittens, and accessories. (NCG Div., Chemetron Corp.)
For free copy circle No. 8 on postcard

Gap-Press Bulletin

In four pages, a new bulletin covers a series of fixed-base, open-back gap presses in 45-60 ton capacities. It contains specifications and dimensions that point up special design and construction features which yield unusual versatility. (The Minster Machine Co.)
For free copy circle No. 9 on postcard

Magnetic Metals

A new, comprehensive booklet on high-permeability magnetic metals contains a wealth of material on permeability and core loss of Carpenter High Permeability "49" and Carpenter HyMu "80" alloys at both 60 and 400 cycles. (Magnetic Metals Co.)
For free copy circle No. 10 on postcard

Long Line of Drills

The Besly line of high-speed steel and carbide drills is presented to the reader in a new 48-page catalog just published. Reamers, and mills, counterbores, tool bits and cut-off blades are included. (Besly-Welles Corp.)
For free copy circle No. 11 on postcard

Bearings and Bar Stock

Now available is a four-page, color brochure that summarizes a custom-designed and standard-stock, sleeve-bearing and bar-stock line. In addition to illustrations, the bulletin carries descriptive data and specifications. (Johnson Bronze Co.)
For free copy circle No. 12 on postcard

Rod Ends and Bearings

An expanded line of rod ends and spherical bearings are featured in a new catalog just published. New standard items are large-size rod ends with bores up to 2 in. and control-rod assemblies in six sizes. Stud rod ends are also available. (SBB Div., MPB, Inc.)
For free copy circle No. 13 on postcard

Expansion Fits

In a recently-published bulletin, expansion fitting is depicted as a time-saving, reliable, assembly procedure. The 12-page offering includes expansion-coefficient tables and nonograms for calculating rates of thermal expansion and determining temperatures. (Cincinnati Sub Zero Products)
For free copy circle No. 14 on postcard

Urges Dust Control

A number of effective methods for controlling industrial dust and fumes are described in a new 20-page bulletin. Its non-technical preface explains the advantages of proper dust control and lists the basic essentials of an adequate dust-control system. (Pangborn Corp.)
For free copy circle No. 15 on postcard

Pump Fundamentals

In 16 pages, this brochure presents an elementary outline of the characteristics, operation and selection of reciprocating, rotary and centrifugal pumps. Non-technical, it's of primary interest to students and those in industry who want a basic knowledge of pumps. (Gould Pumps, Inc.)
For free copy circle No. 16 on postcard

Eyes for Industry

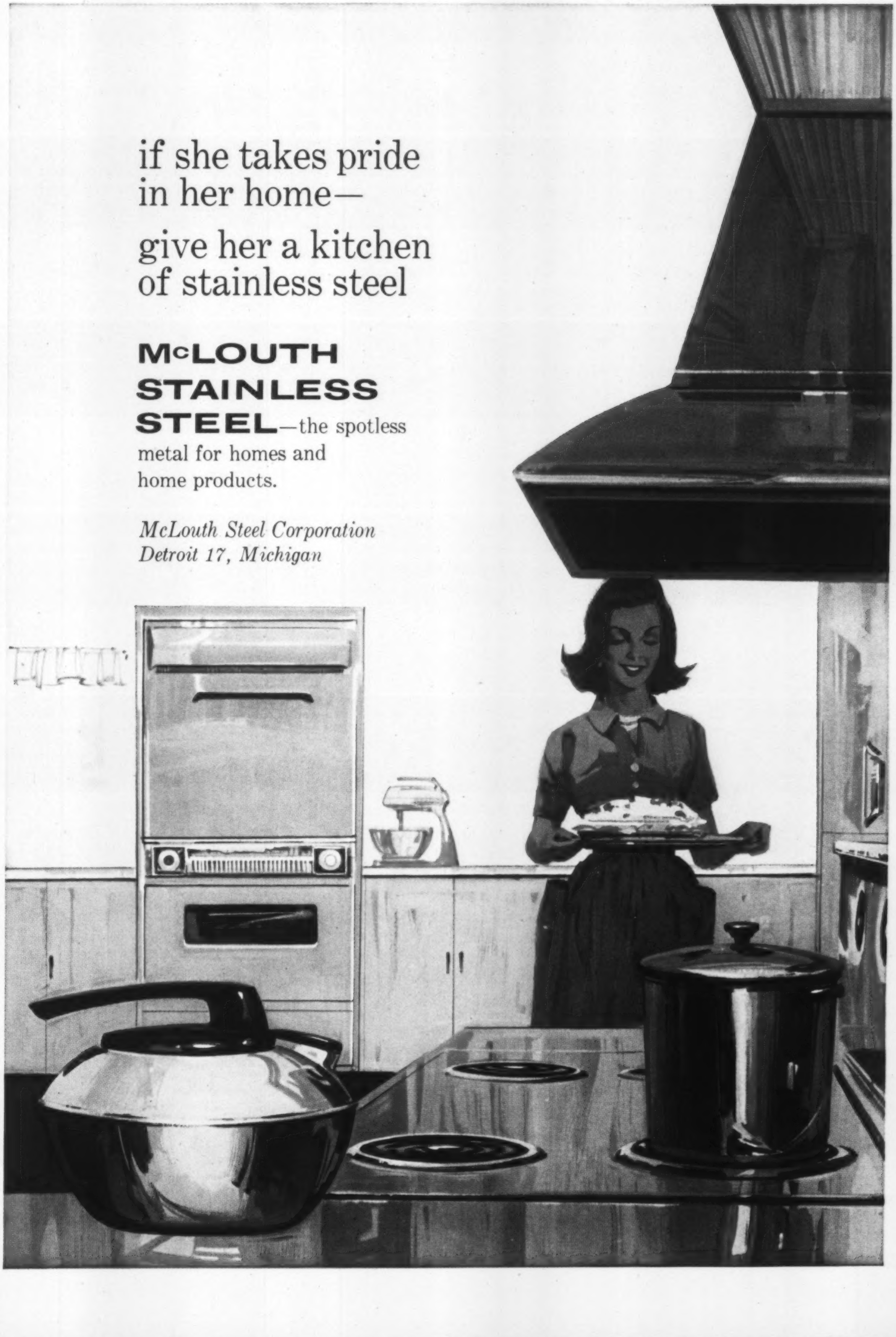
Closed-circuit television supplies science and industry with a versatile monitoring tool. At least, that is the contention of an attractive folder which lists various applications for this electronic equipment. (Electronic Div., Fairbanks, Morse & Co.)
For free copy circle No. 17 on postcard

Men Working

Patternmakers, molders, core makers and machinists all contribute to foundry operations. A look inside the "Kutztown Review" reveals a cross section of these men who actually fill a foundry customer's orders. (Kutztown Foundry & Machine Corp.)
For free copy circle No. 18 on postcard

Field Compressors

A new two-color bulletin describes packaged field compressors for gas lift, gathering, boosting and injection. These carefully-engineered units are available in more than twenty-five models, from 100-1100 hp—with discharge pressures up to 6000 psi. (The Cooper-Bessemer Corp.)
For free copy circle No. 19 on postcard



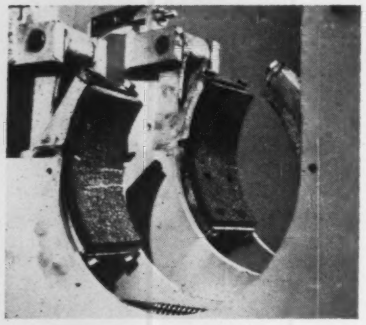
if she takes pride in her home—

give her a kitchen of stainless steel

McLOUTH STAINLESS STEEL—the spotless metal for homes and home products.

McLouth Steel Corporation
Detroit 17, Michigan

New Materials and Components



Heavy-Duty Industrial Brakes Get Bonded Linings

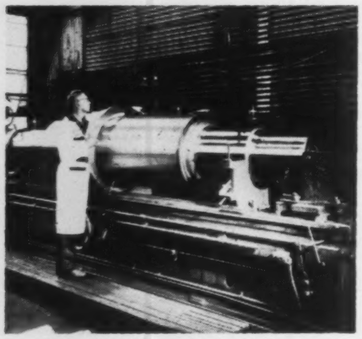
Field trials of these bonded-industrial brake linings indicate they're suitable for heavy-duty steel mill and industrial uses. The advanced linings will become standard equipment on a line of industrial brakes. Bonded linings offer several advantages over conventional riveted assemblies. For instance, there are no rivets to score brake drums as the lining wears. And bonded linings last longer because they are effectively thicker. Also elimination of rivet holes results in a 10 pct boost in braking surface. As before, replacement of the new linings requires no disassembly of the brake or demounting of shoes. (General Electric Co.)

For more data circle No. 21 on postcard, p. 107

Pin-in-Pin Fastening Saves Underdesigned Joints

One good fastener deserves another, when a new design suddenly needs beefing up or existing equipment requires more strength. Now, if the second fastener simply fits inside the first, you get more performance without sacrificing space. Extra drilling, tapping or other cost-boosting operations are also sidetracked. What kind of fastener can do this? Surprisingly enough, simple spring pins fill the bill. These split-tube units are designed to be driven into a hole slightly smaller than the spring-pin OD. Compression locks each pin firmly in place. This same principle carries over to pin-in-pin combinations, since one spring pin is simply inserted within a larger spring pin. (Standard Pressed Steel Co.)

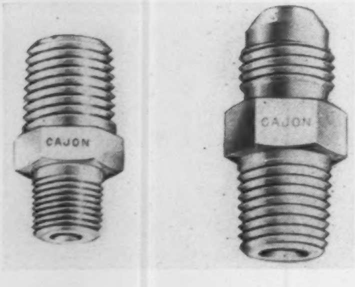
For more data circle No. 22 on postcard, p. 107



Carburized-Steel Rolls Provide Uniform Hardness

For roll applications where wear resistance is a must, gas-carburized steel rolls offer several important advantages over iron units, according to a prominent roll manufacturer. Higher, more-uniform hardness is one big bonus. The company also states that carburized steel has a higher modulus of elasticity, better heat transfer, longer-wearing properties and finer finishes. Resistance to thermal shock, warpage, breaking and scaling further recommend the carburized-steel product. Available in both tubular and solid types, advanced facilities permit production of these rolls in sizes up to 48-in diam x 24-in. length. (The Badall Co., Inc.)

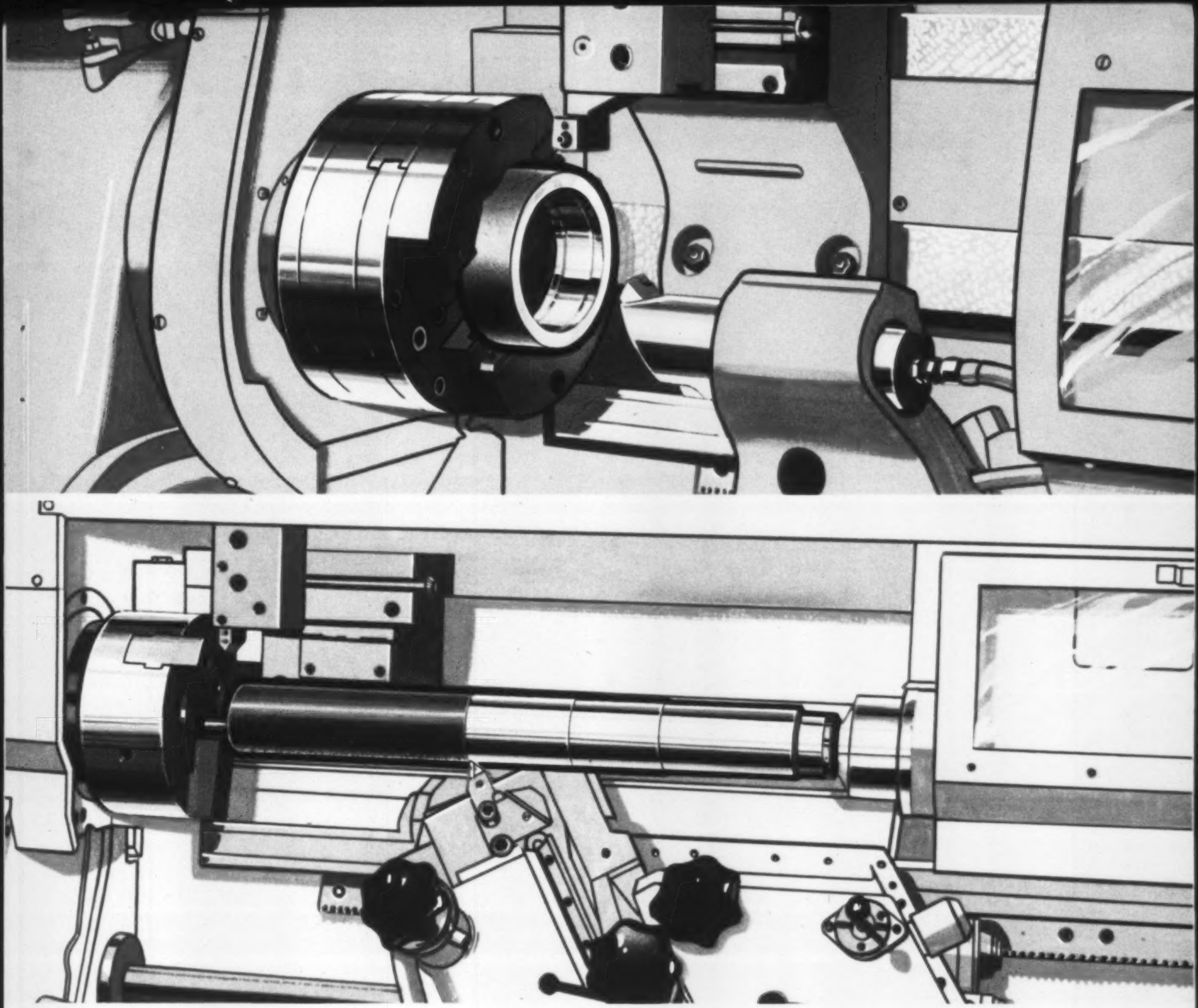
For more data circle No. 23 on postcard, p. 107



Plastic Pipe Fittings Solve Corrosion Headaches

Here's a new line of precision pipe fittings that's furnished in the following plastics; Teflon, Zytol (nylon), PVC, Profax, polyethelene, Plaskon, Penton, Kel-F and Delrin. You can select the right plastic to combat corrosion, chemical reactions and leakage in vacuum lines. Plastics also serve as electrical insulators. In addition, their use reduces installation weight in most cases. Units in the line come in a complete range of shapes and sizes from 1/16-1 in. nominal pipe diameter. (Cajon Co.)

For more data circle No. 24 on postcard, p. 107



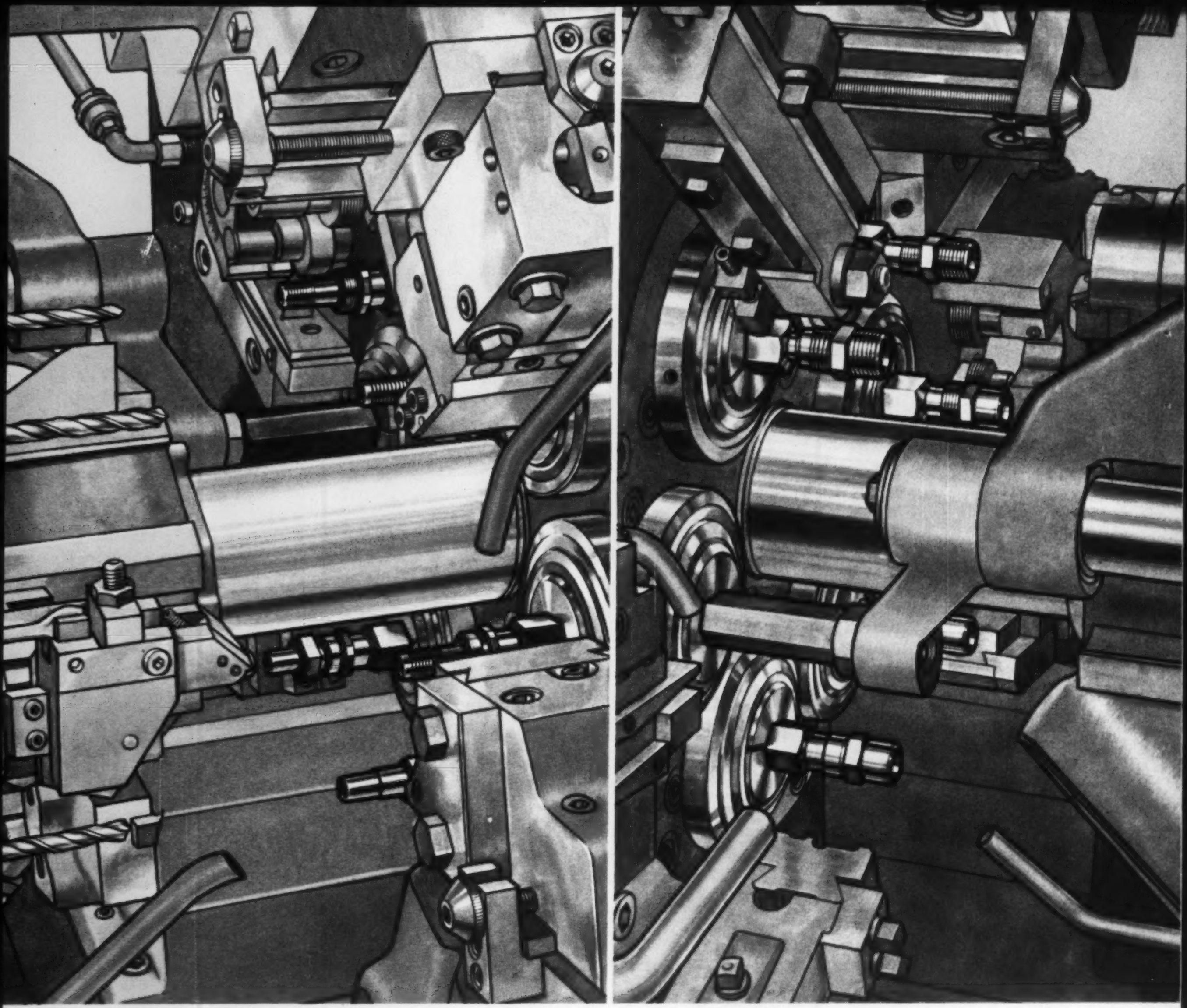
Years-ahead flexibility
in New Britain's +GF+ *Copying Lathes*

One of the best ways of making sure you're on the right track when you buy a new machine is knowing what you want the equipment to do and then being sure the equipment you buy can do it. This sounds pretty basic, but it's difficult to forecast just what you are going to require of a machine through all the years you will use it. In this department, the New Britain +GF+ Copying Lathe has a lot of peace-of-mind insurance built right into it. For instance, the basic design of the machine suits it for a wide variety of work. The single-tool copy-turning principle is equally well suited for both chucked *and* between-centers work on internal and external surfaces.

Because the tool path is controlled by an easy-to-install template (or a prototype) set-up and change-over are accomplished in a few minutes. The cutting tool can be replaced in a matter of seconds. Back facing is accomplished as part of the machining cycle by means of a top-mounted attachment.

The New Britain +GF+ is truly a machine that can pull more than its own weight in any metal-working shop. On top of that, it can adapt quickly and easily to the widest possible number of new requirements that may be placed on it in the years to come. A new catalog describes the complete line in detail.

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division ◆ New Britain, Connecticut



Stainless, 225 *per hour* — *brass,* 1500 *per hour*

Speed is only part of the story on New Britain's completely new line of four-, six-, and eight-spindle bar machines. Guaranteed accuracy, production run after production run, year in, year out, helps round out the story. If you haven't seen any of the new series in action—six models in all—you owe it to yourself and the profitable productivity of your plant to arrange for a demonstration. All of the exclusive New Britain features you are probably familiar with have been retained and improved. New features unavailable on any other machines have been added. The result—the finest high speed bar turning units on the market. Your New Britain representative is the man to see. He can show you applications, parts production case histories, show you to fractions of seconds and pennies why new New Britain bar machines are an investment in greater profits with every piece they produce.

Model	Spindles	Cross Slides	Spindle Speeds	Spindle Capacity	H.P.
450	4	4	41-621	5⅛"	30-50
52	6	6	271-4250	1¼"	15-25
62	6	6	177-2519	1⅝"	15-30
62	6	6	177-2519	2¼"	20-30
635	6	6	63-630	3½"	30-50
826	8	6	98-1481	2⅝"	30-50

THE NEW BRITAIN MACHINE COMPANY
New Britain-Gridley Machine Division ◆ New Britain, Connecticut

Shock Absorbers

Having a wide range of sizes and load capacities in stock, one company claims it can fill 95 pct of industrial applications with off-the-shelf deliveries. J. T. Ellis company president, states: "Standardizing design means that a customer can now select the shock absorber that will meet his specific needs and order it from stock." (Ellis Fluid Dynamics Corp.)

For more data circle No. 25 on postcard, p. 107

Acid-Pickle Chain

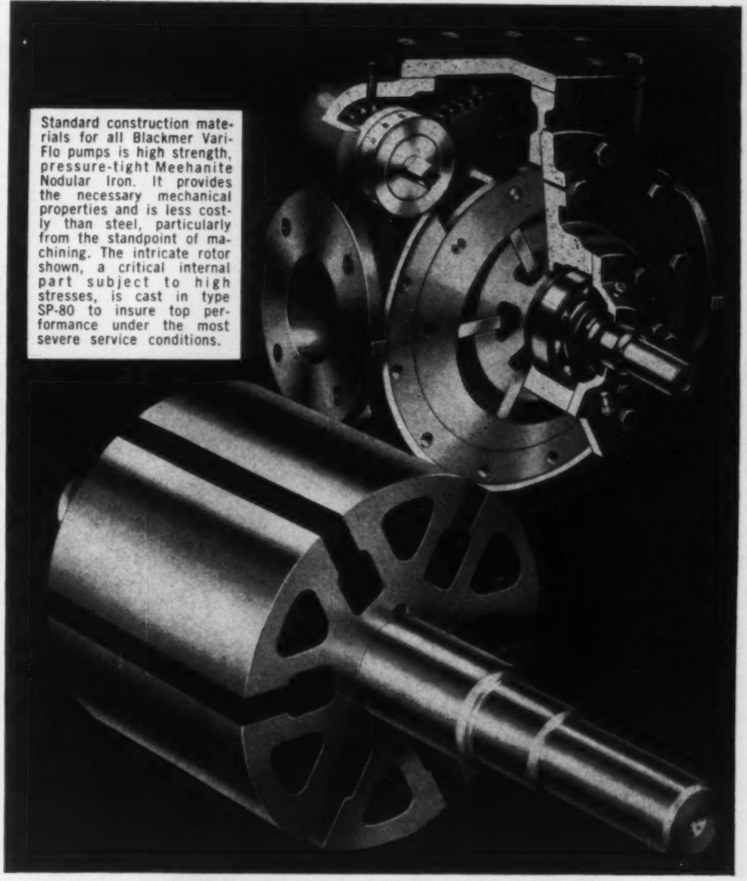
Here's a new chain that's designed to stand the gaff in high-temperature sulphuric- or nitric-acid pickling operations. As an integral part of each link, the chain has a full stud that resists deformation under load and greatly increases chain life. Because of this full-stud construction, there's a 31 pct increase in recommended working-load limits. The chain is also non-kinking and crush resistant. It withstands concentrations of sulphuric acid up to 20 pct at temperatures up to 200°F. This high-temperature resistance can result in substantial savings. (American Chain & Cable Co., Inc.)

For more data circle No. 26 on postcard, p. 107

New Master Alloy

The commercial availability of a new master alloy for the titanium

MEEHANITE MEANS BETTER CASTINGS®



Standard construction materials for all Blackmer Vari-Flo pumps is high strength, pressure-tight Meehanite Nodular Iron. It provides the necessary mechanical properties and is less costly than steel, particularly from the standpoint of machining. The intricate rotor shown, a critical internal part subject to high stresses, is cast in type SP-80 to insure top performance under the most severe service conditions.

SOLVE YOUR TOUGH CASTING PROBLEMS WITH MEEHANITE NODULAR

The excellent castability of Meehanite Nodular in combination with exceptional strength, ductility and wear resistance has led to its wide acceptance for intricate pressure castings and many other components which must withstand severe service conditions. The broad range of its utility is further enhanced by inherent production advantages resulting in a reduction of manufacturing costs.

Meehanite Nodular is available in a broad range of properties embracing all current Nodular specifications and including some unique new wear and heat resisting types. When you specify one of the S types of Meehanite Nodular, you can be sure of obtaining castings that live up to specified claims. Meehanite foundries have more than a quarter of a century of experience in handling the essential materials used to convert the graphite in cast iron from the flake form to the nodular which gives this family of metals its unique engineering properties. Meehanite patented quality controls assure uniform dependability regardless of how small or how large the casting.

For complete information about Meehanite Nodular, send for a free single copy of our eight page brochure (B-47-A). Write: Meehanite Metal Corporation, 714 North Avenue, New Rochelle, New York.

MEEHANITE METAL

MEEHANITE CASTINGS ARE MADE ONLY BY MEEHANITE FOUNDRIES.

industry has been announced. A eutectic alloy, it has a nominal composition of 50 pct molybdenum, 45 pct aluminum and 5 pct titanium. The alloy is a high purity, low-melting-point alloy (1760°C) which is free from molybdenum segregation. Its use assures satisfactory performance in fabrication and service, especially when high-temperature strength, formability, and creep resistance at elevated temperatures are necessary. (Vanadium Corp. of America)

For more data circle No. 27 on postcard, p. 107

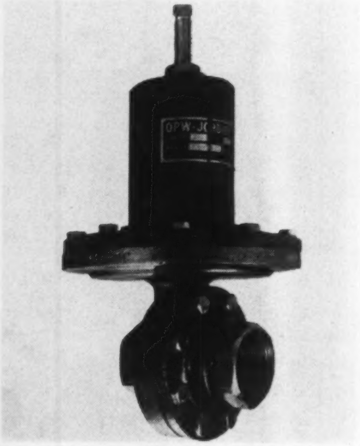
Supports Zinc Coating

Here's a metallic solution which, when sprayed, brushed or dipped on galvanized metal, forms a union with the zinc and deposits a noncorrosive, chip-resistant coating. This coat offers a tenacious paint-adhesion surface and completely eliminates peeling and blistering of galvanized surfaces. (Rip-Trude Corp.)

For more data circle No. 28 on postcard, p. 107

Pressure Regulators

Back-pressure regulators are available in ¼-2 in. sizes. The valves are suitable for 250-psi use at 500°F in ductile-iron and brass bodies. At 600°F, they handle 300 psi with stainless-steel and cast-steel bodies. The regulators can function in steam, water, air-oil, gas or chemical service. (OPW-Jordan Corp.)



For more data circle No. 29 on postcard, p. 107

Pushbutton Switches

Four new forms add to a line of space-saving, oil-tight pushbuttons. They include: Bat-lever selection switch; coin-operated selector switch; wobble-stick operator; and, cylinder-lock selector switch. Stocking a small number of these components makes many different combinations possible. (General Electric Co.)

For more data circle No. 30 on postcard, p. 107

Multi-Pole Relays

Multi-pole relays feature compactness, along with a high degree of reliability. Available in 2-, 3-, or 4-pole, double-throw forms, the new relays may be equipped with coils for ac operation to 230 v, or operation to 115-v dc. Each 4-pole unit

Pangborn
ROTOBLAST
STEEL SHOT

COST-CUTTER

The *only* accurate way to measure your abrasive costs is to determine *cost per ton of castings cleaned—not* just the cost of abrasive.

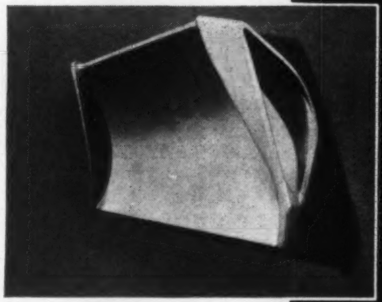
Rotoblast Steel Shot and Grit clean castings at lower cost per ton than other abrasives. That is why Rotoblast Steel Abrasives are the fastest growing on the market today. *Sales volume has tripled in 3 years!*

Low phosphorus, low sulfur steel and a special heat-treating process make Rotoblast Steel Shot and Grit solid, tough and free of voids and hollows—that's why they can save you so much on cleaning costs. For actual figures, write to:

PANGBORN CORPORATION, 1500 Pangborn Blvd., Hagerstown, Md.; Pangborn Canada Ltd., 47 Shaft Rd., Toronto, (Rexdale), Canada:—*Manufacturers of Rotoblast® Steel Shot and Grit®; Blast Cleaning, Vibratory Finishing, Dust and Fume Control Equipment.*

Pangborn
OF HAGERSTOWN

Made to deflect tornadoes at white heat . . .



Casting of nozzle guide vane for turbo-jet engine

Radiograph shows casting sound and up to its job

Nozzle guide vanes in turbo-jet engines must withstand fiery blasts — dependably. Austenal Company, division of Howe Sound Company, checks the soundness of each cast vane with radiography

Cobalt base or nickel base high-temperature alloys are required in order to withstand these terrific temperatures. Investment castings are specified because of the alloys that must be used and because the vanes would be almost impossible to forge, machine, or otherwise fabricate, at the cost level of investment castings.

Austenal Company, division of Howe Sound Company, casts these blades by the "lost wax" method. Each one is then radiographed to make sure that no hidden flaw lurks within that could cause failure.

Makers of quality castings, small and large, find radiography invaluable in making sure that only high-quality work is delivered. It is a way reputations are built and new business won.

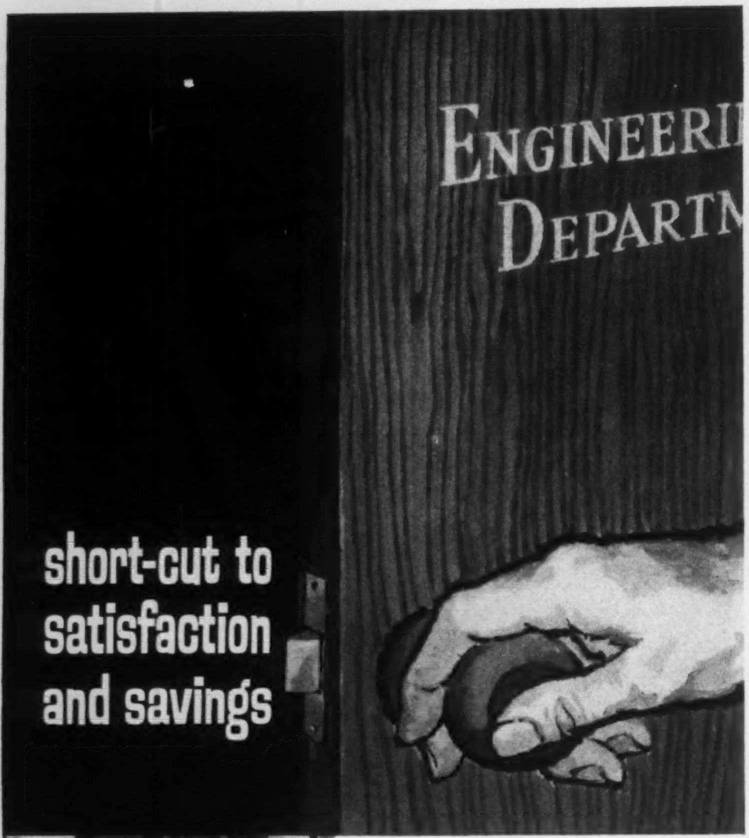
Radiography can work for you, too. To find out how, talk it over with an x-ray dealer or write us for a Kodak X-ray Technical Representative to call.

New . . . Ready Pack in ROLLS and SHEETS. Kodak Industrial X-Ray Film, Types AA and M, in 200-ft. rolls (16mm, 35mm, 70mm) and sheets (8 x 10, 10 x 12, 11 x 14, 14 x 17).

- No darkroom loading—film sealed in a light-tight envelope.
- Just place Ready Pack in position and expose.
- Film protected from dust, dirt, light and moisture.
- In the darkroom—remove film from envelope and process.

Kodak
TRADEMARK

EASTMAN KODAK COMPANY
X-ray Sales Division • Rochester 4, N.Y.


ENGINEERI
DEPARTM
short-cut to satisfaction and savings

Rolled Steel Rings of simple or complex cross-section can be produced by the Edgewater process, in diameters from 5 to 145 inches. Materials include carbon steel, stainless and heat-resisting alloys, tool steel.

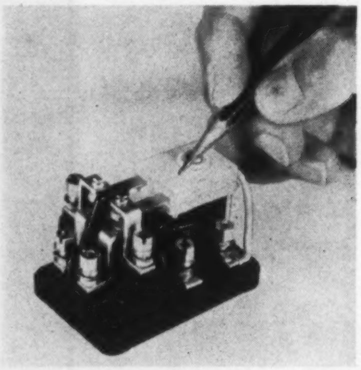
Edgewater's first step in answering an inquiry for rolled steel rings is to have Engineering check the proposed design for possible modifications that would improve the ring and/or reduce the price. This assures a good design—one that meets all requirements, at lowest cost.

Forged from solid blocks of steel and rolled on a powerful ring mill, Edgewater weldless rings are formed to cross-section shapes so close to finished dimensions that very little machining is needed. Close tolerances mean less labor, less scrap loss, lower overall costs. The Edgewater rolling process assures maximum strength, toughness and uniformity. Send drawings for recommendations and prices.

INTERESTING description of the ring-rolling process is given in this brochure, **Edgewater Rolled Steel Rings.** We will be glad to send you a copy.

Edgewater Steel Company
P.O. Box 478 • Pittsburgh 30, Penna.

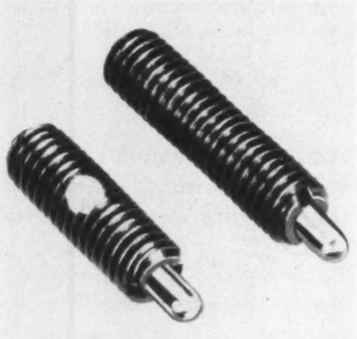
measures only 12⅝-in. wide x 3⅛-in. deep x 1 29/32-in. high. Relay contacts, rated at 10 amp, are self aligning and self cleaning. (Ward Leonard Electric Co.)



For more data circle No. 31 on postcard, p. 107

Spring Plungers

A new line of spring plungers withstands continuous flexing without crystallizing. The plungers are used to position parts in jigs and fixtures. When compressed, the spring allows the plunger to recede entirely into the threaded body. A set screw, backing up the spring, is preset and locked in with a special sealant for uniform, constant pressure. (Jergens Tool Specialty Co.)



For more data circle No. 32 on postcard, p. 107

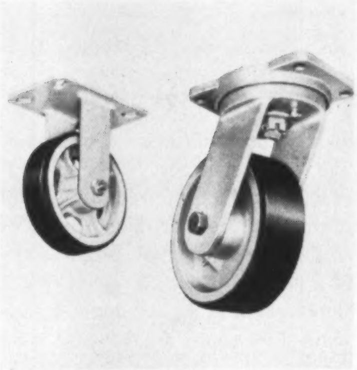
Liquid-Level Gage

An indicating control, which provides an accurate visual readout of liquid level variations in refrigerant vessels, is now commercially available at low cost. It's manufactured to order, with single- or multiple-control switches to provide automatic operation of pumps, valves, indicator lights, alarm bells, compressor shutdown and signal circuits. The control has only five major parts: The float-chamber guard section; control switch; combination float ball, rod and magnet-indicator; and an indicator glass. (H. H. McKinnies Co.)

For more data circle No. 33 on postcard, p. 107

Special Casters

Casters roll easier along the floors when their tread is made from Duralast. At least that is the contention of one company which uses it on a line of casters. This tread material is a synthetic-urethane elastomer that resists corrosion. It's also noiseless, nonmarking and impervious to oil, brine and solvents. (The Hamilton Caster & Mfg. Co.)



For more data circle No. 34 on postcard, p. 107

Motor Insulation

Providing added protection to windings against moisture, chemicals, oils and abrasive contaminants, a new insulation system increases the life of open motors used in unfavorable environmental conditions. This system features rectangular copper conductors covered with a basic insulation of fused Dacron and fibers, which are formed and impregnated with a high-dielectric, insulating varnish. The varnish penetrates the spaces between the conductors and augments the basic insulation on the copper. (The Louis Allis Co.)

For more data circle No. 35 on postcard, p. 107

Another "impossible" job done by the Airbrasive...

...lapping steel

abrading • cutting • deburring • stripping • drilling • cleaning • scribing

Eclipse-Pioneer found: Airbrasive reduces lapping time from eight hours to 15 minutes!

When Eclipse-Pioneer, Division of The Bendix Corporation, hand-lapped shallow inclines in these alloy steel thrust bearings to depths of 0.0002" to 0.0004", it took *eight hours* of laborious effort.

The S. S. White Industrial Airbrasive "does a better job... *and takes 15 minutes!*" they tell us.

Here is a unique industrial tool of many uses... cutting semiconductors... adjusting microelectronic circuits... removing microscopic burrs... cleaning surfaces... and many others. It performs its magic with a superfine stream of abrasive particles and propellant gas that quickly cuts almost any hard, brittle material.

Important too... The Airbrasive is available at a cost you can afford... Under $1,000.00!

Send us samples of your "impossible" jobs and we will test them for you at no cost.

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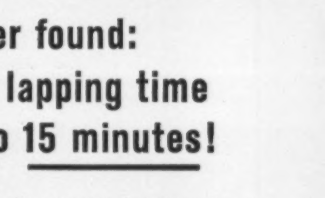
... complete information.

1136

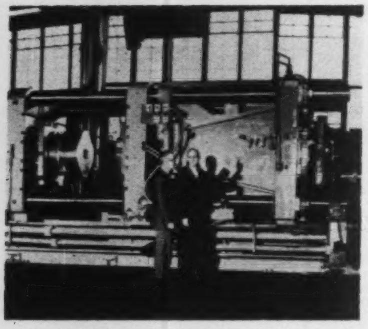
New dual Model D!



S.S.White

S. S. White Industrial Division
Dept. 32-A, 10 East 40th Street, New York 16, N. Y.

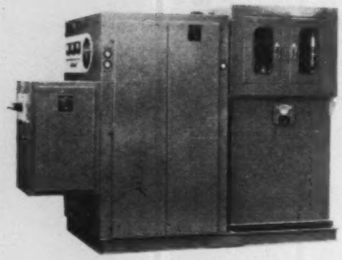
New Equipment and Machinery



Die-Casting Machine Turns Out Complex Parts

Rated at 1300 tons of die-locking force, this huge die-casting machine actually tested out to 1600 tons in a standard strain-gage setup. With this equipment, large, complex aluminum castings are turned out to the highest degree of tolerance, structural density and finish. Gasoline-engine blocks, transmission housings, large control cabinets, gear boxes and lawnmower covers are just a few of the many products produced to exacting specs. Rugged construction accounts for this unusual capacity. Weight of the machine itself is the tipoff. It's in excess of 150,000 lb. Die platens measure about 5½ x 7 ft with 5-ft clearance. (Kux Machine Co.)

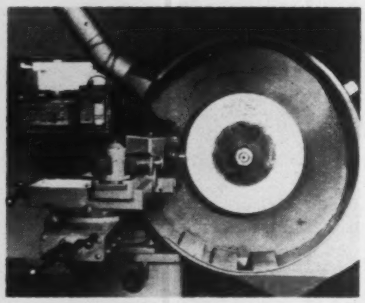
For more data circle No. 36 on postcard, p. 107



Induction-Heating Unit Has Ample Reserve Power

Both research and production men should find a new electronic induction-heating unit of interest. It's quickly-installed, easy-to-maintain and capable of high-power output. Rated for continuous duty at 150 kw, the newcomer has sufficient reserve power built-in to deliver full output at distances up to 40 ft from the generator. Design features include uncomplicated installation, ready accessibility for maintenance, pushbutton operation, and output transformer that provides simple work-coil matching. Thermostatic controls keep raw-water consumption at a minimum. Installation dimensions are 54 x 91 x 82 in. (Induction Heating Corp.)

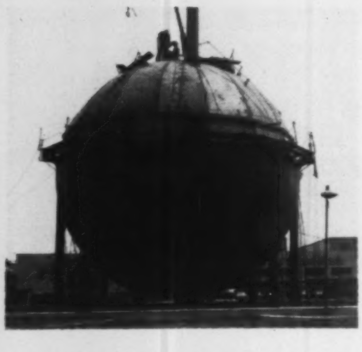
For more data circle No. 37 on postcard, p. 107



Electronic Device Gages Grinding-Wheel Hardness

This electronic device tests the hardness and uniformity of a grinding wheel while it's rotating. Test results are recorded on a permanent tape. This readout helps wheel manufacturers improve the quality of their product. Users of grinding wheels find the tape record useful for quality-control inspection of their production grinding. In operation, the testing device passes a conical steel cutter across the face of a moving wheel. This cutter crushes small amounts of abrasive from the wheel's surface. In the process, it precisely measures the force required. (Macklin Co.)

For more data circle No. 38 on postcard, p. 107



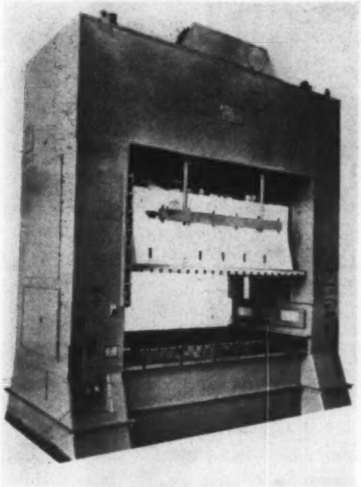
Mammoth Tank Stores 560 Tons of Liquid Oxygen

Under construction as part of a steelmaking complex, a giant spherical tank will store liquid oxygen at 300° below zero. This unit will solve a key storage problem, since the new steelmaking process requires a continuous oxygen-gas supply to the openhearth furnaces. The tank's outer shell is 38 ft in diameter. Inside, insulation 3-ft thick separates this outer shell from an inner aluminum container capable of holding 560 tons of liquid oxygen. It would take a tank 300 ft in diameter to store an equivalent amount of gaseous oxygen, since 1 cu ft of liquid oxygen equals 860 cu ft of oxygen gas at standard atmospheric conditions. (Ford Motor Co.)

For more data circle No. 39 on postcard, p. 107

Eccentric Press

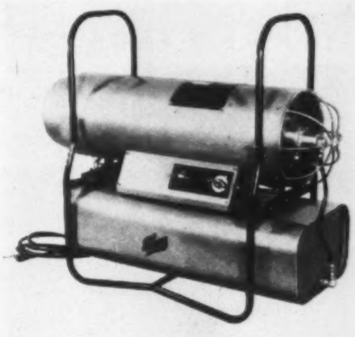
Designed to produce a wide variety of automotive stampings, a new 400-ton, two-point eccentric press features advanced styling. Welded-steel construction, that's stress-relieved by tierods, reduces maintenance. With a full-eccentric drive employing no crankshaft, the press delivers high torque. Accuracy results from a box-type slide and a dependable barrel-type slide adjustment. Operating at a speed of 18 strokes per minute, there's a 20-in. slide stroke with a 10-in. adjustment. Bed area is 132 x 72 in. Distance from bed to slide, with stroke down and adjustment up, equals 40 in. (The Cleveland Punch & Shear Works Co.)



For more data circle No. 40 on postcard, p. 107

Modern Space Heater

Exclusive features promote real economy with this modern new space heater. It's a portable, oil-fired unit for temporary heating and drying in frigid work areas on construction sites, and for all industrial emergencies. Low-pressure firing provides an amazing 0.90-gal per hour fuel consumption. Since the burner atomizes fuel centrifugally, there's no odor, no smoke, and no build-up of fumes. Upkeep is kept down because there are no nozzles, no burner tips, and no small orifices to become clogged or blocked. The unit's output ranges between 70,000 and 125,000 btu—or any graduation in between. Temperatures can be controlled by simply turning a dial from low to high. Dry weight of the heater is only 42 lb. (Thor Power Tool Co.)



For more data circle No. 41 on postcard, p. 107

A Fine Grind

Fully-automatic, a new laboratory mortar will work with a wide range of either wet or dry materials. It's especially suited for grinding caustic, dust-forming and poisonous materials. Radioactive sub-

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New! Cutler-Hammer Size 00 A-C Magnetic Starter... 20% smaller...18% less cost

Now save space and money with the all new Cutler-Hammer Ac-Magnetic Starter. The new Size 00 fits about 40% of the applications where the Size 0 is now used. You still get the famous Three Star line quality—same high reliability—famous vertical, dust-free silver contacts. Max. hp ratings: 3 phase: 208/220V., 1½ h.p. 440/550V., 2 h.p. Single phase: 115V., ⅓ h.p. 230V., 1 h.p. Get it open or in NEMA 1 enclosure. Send for Pub. LO-40-S246.

WHAT'S NEW? ASK . . .

CUTLER-HAMMER

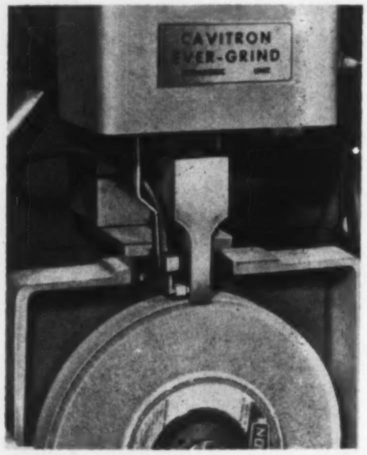
Cutler-Hammer Inc., Milwaukee, Wisconsin • Division: Airborne Instruments Laboratory • Subsidiary: Cutler-Hammer International, C. A. • Associates: Cutler-Hammer Canada, Ltd.; Cutler-Hammer Mexicana, S.A.

stances are ground to analytical fineness (up to 1 micron). Here's just a few of the outstanding features. Grinding pressure is variable up to 9 kilograms. Hard or sticky materials present no problems. Also, pressure can be changed and then reset to the same value. In addition, the charge is kept under a dustproof seal. (Schuco Scientific, a division of Schueler & Co.)

For more data circle No. 42 on postcard, p. 107

Grinding Aid

Designed to improve the performance and life of any grinding wheel, a new electronic device reduces excessive loading on the wheel. The practical effect of this action is to lessen the need for dressing downtime. Because it prevents particle build-up in the wheel's open-abrasive structure, it permits the use of finer and harder grinding wheels. This promotes better surface finishes and higher dimensional accuracy. Burning and deterioration of the work is also held to a minimum, even on hard-to-grind metals. Here's the operating principle. An aluminum tool attaches to a magnostrictive transducer. This tool is placed close to the wheel's grinding surface. As coolant passes through the tool and on to the wheel, thousands of bursting bubbles are induced within the agitated cooling fluid. These bubbles "explode" against the grinding wheel as it rotates. This action blasts away any build-up of metal particles. It also cools the wheel. (Cavitron Equipment Corp.)



For more data circle No. 43 on postcard, p. 107

Drills From All Angles

New in concept, this multi-spindle machine simultaneously drills, counterbores, taps and reams a workpiece from almost any angle. It's heads revolve 360° both horizontally and vertically, either on or under the work table. According to the manufacturer, this is the most versatile and economical drilling machine available to the metalworking industry. To back up this claim, the company states that although the newcomer is equivalent in power to a 17-20 in. unit, it per-

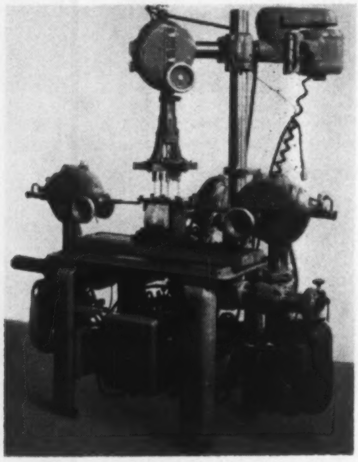


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Exhibit 821

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AUTOMOTION best describes AGF's unique automatic heat treating furnaces . . . both Reciprocating Hearth and Rotary Retort . . . employing the "Work in Motion" principal that assures uniformity of case and hardening.

AGF's AUTOMOTION Furnaces operate **wholly automatically and continuously,** and are easily placed in any continuous or intermittent production line.

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forms as a special-purpose machine for continuous runs. At the same time, it can be readily rearranged to meet the requirements of other jobs. (Van Norman Machine Co., a division of Van Norman Industries, Inc.)

For more data circle No. 44 on postcard, p. 107

Supplies Welding Power

This cost-saving power supply stores and releases precise welding energy of 20-225 watt-seconds to permit 50-120 spot welds per minute. It operates on a stored-energy principle that saves costs, especially on peak loads, by drawing only a fraction of the power required by an ac welder. Moreover, it stores and discharges the same amount of power for each weld. Normal line-voltage fluctuations don't affect results. (Commercial Apparatus & Systems Div., Raytheon Co.)

For more data circle No. 45 on postcard, p. 107

Impregnates Castings

A new impregnating material yields nearly 100 pct casting recovery with only one application, in cases where two or three impregnations were previously the rule. This product contains fillers equal in dimension to the porosity of a casting. These fillers, like the casting's porosity, progressively increase in quantity as they decrease in size. Thus, there are comparatively few at 0.0016 in., but a large quantity at 0.000004 in. The fillers are inert, and they don't stain metal. Also, the relatively-low specific gravity and extreme fineness of the mineral substantially decreases sludging of

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OVERHEAD
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in capacities to 150 tons

Conco Semi-Gantry Crane
custom-engineered for service
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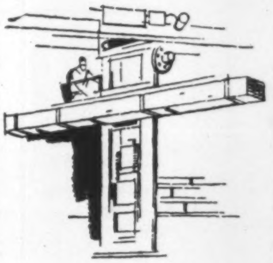

For information on Conco Cranes, Hoists and Trolleys Request Bulletin 5000B

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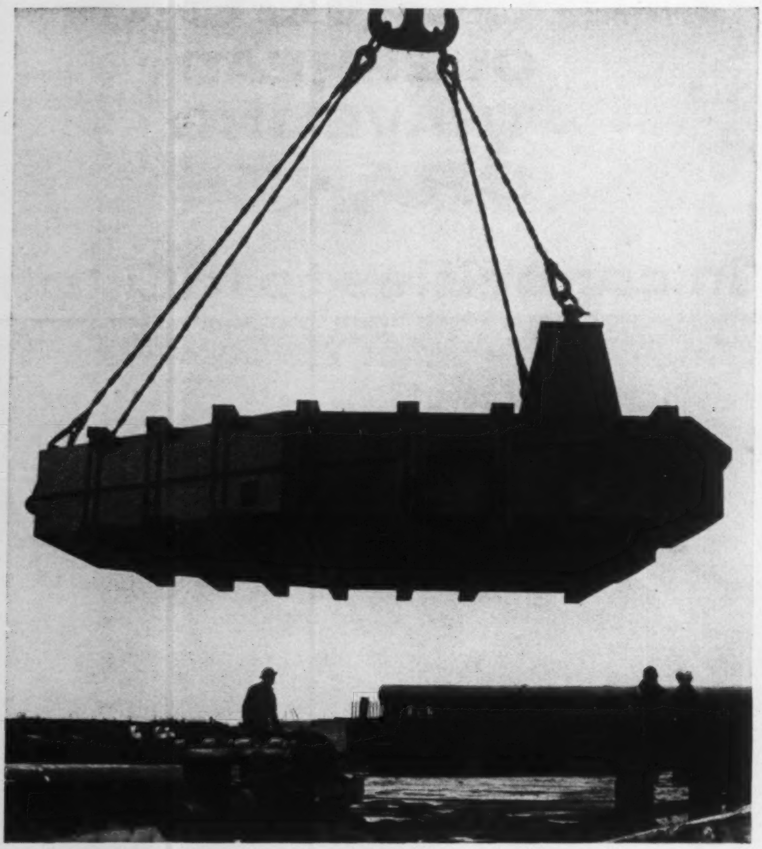
CHICAGO TRAMRAIL, manufacturer of "Trak-Rak" Stacker Cranes, Monorail Systems, and "Fas-Lok" Storage Racks at 1330 S. Kostner Ave., Chicago, is now a DIVISION OF CONCO ENGINEERING WORKS, INC.



Special CF&I-Wickwire Slings lift 85-ton missile-blast doors

The slings pictured above were tailor-made by CF&I to handle 85-ton explosion-blast doors produced by Yuba Consolidated Industries, Inc., San Francisco, for overseas missile-launching installations.

To accommodate the double hook on Yuba's 125-ton derrick crane, a pair of two-legged bridle slings are used in each lifting operation. Because of the positioning of the lifting pads and the center of gravity of the load, the legs of the slings are of varying length. As a result, the doors stay level as they are lifted from concrete slabs onto barges and, eventually, onto ocean-going vessels.

This is the kind of problem-solving service you can count on from CF&I.

For complete information on our wide range of Wickwire Wire Rope Slings, write us today.

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ROPE
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The Colorado Fuel and Iron Corporation
Denver • Oakland • New York
Sales offices in Key Cities

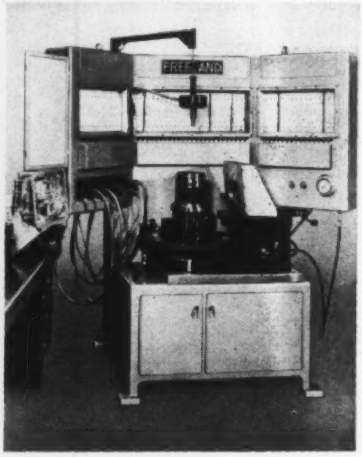
8302

the hot, diluted impregnator during use. (Frederic B. Stevens, Inc.)

For more data circle No. 46 on postcard, p. 107

Checks 55 Dimensions

Here's a center-column, single-station air-gage unit that checks out 55 separate, critical dimensions on automatic transmissions for autos. The information obtained is then used for adjusting transfer-machine tooling as the gage locates in the transmission's construction holes and mounting face. Easily read indicators with a graphic chart immediately above the part, hold operator fatigue to a minimum. (Freeland Gauge Co.)



For more data circle No. 47 on postcard, p. 107

Gas-Flow System

A new low-cost system monitors and records gas flow from multiple remote stations. Any flow measurement that can be indicated by a contact closure may be used as an input. Gas flow count is transmitted over commercial-telephone lines and centrally displayed on individual 5-or 6-digit counters. Recording of the counter totals can be done on demand, or automatically under program control. The programmer scans the counters and presents the count to a recording device. Five to 120 points are easily handled. (Datex Corp.)

For more data circle No. 48 on postcard, p. 107

The IRON AGE SUMMARY

Auto Strikes Cut Into Shipments

GM's series of strikes at the local plant level are cutting deeply into September auto production.

As a result, steel shipments are being held up or diverted.

■ Auto strikes will cut deeply into September steel shipments. Even a settlement of General Motors' far-flung plant strikes this week would cut nearly 190,000 cars from September production schedules.

Furthermore, the possibility of similar local labor troubles at Ford and Chrysler can not be dismissed. Ford and Chrysler are still negotiating under extended contracts with the United Auto Workers.

Costly Losses — By early this week, GM's local strikes had cost the company about 130,000 cars (assuming a production schedule of 13,000 a day). At the very earliest, production could not be resumed before next week. Although many plants have settled their issues, some are prevented from operating by strikes at supplier divisions.

This week the strike had not cut into steel production, although some shipments of steel (particularly by truck) had been held up by GM. But if the strikes are not settled by early next week, some steel orders scheduled will have to be held up. Setbacks will expand each day the strikes last.

No Lasting Threat — The auto strikes do not threaten the overall steel market. Instead, the demand for steel in October and November will intensify as GM tries to make up for lost ground. In addition steelmakers have consistently doubted that fall automotive steel orders are large enough to meet ambitious auto schedules.

To further complicate the delivery situation in weeks to come, auto parts makers have been uncertain of demands and have not built up great stocks of steel. The one-two punch of automakers and suppliers in October and November will assure a first-class scramble for tonnage.

General Advance—On the general steel market, demand continues to advance on a broad basis. October bookings from automakers were strong, but not up to hopes, prior to labor troubles. Inventory building is past its initial phase and growing. Prices at the warehouse level are firming up a bit. Mills are filling books at a good rate even without extremely strong support from automakers.

Over 80 Percent—In spite of the automotive picture, steel operations are in for a steady rise through the year and well into 1962. Steelmaking operations (as a percent of capacity) should average 67 pct for the third quarter, from 75 to 77 pct in the fourth, with the rate touching 80 pct before the year is over.

A significant change is noted in steel buying. Most of the upturn so far this year was characterized by an increase in number of orders. Now, the emphasis has shifted to size. This means that steel users are not only trying to build up some inventory, but they are doing it in the face of their own increasing consumption.

District Steel Production Indexes 1957-59=100

	Last Week	Two Weeks Ago	Month Ago	Year Ago
North East Coast	114	115	114	85
Buffalo	103	100	90	87
Pittsburgh	101	98	90	63
Youngstown	97	98	96	73
Cleveland	134	125	109	81
Detroit	143	136	128	104
Chicago	111	111	106	93
Cincinnati	113	122	109	82
St. Louis	93	101	115	95
Southern	89	108	110	69
Western	112	109	115	83
U. S. Index	109.1	109.1	104.4	81.1

Source: American Iron & Steel Institute

Steel Production, Composite Prices

Production	Last Week	Two Weeks Ago	To Date 1961	To Date 1960
(Net tons, 000 Omitted)	2,032	2,032	66,204	76,696
Ingot Index				
(1957-59=100)	109.1	109.1	96.0	111.3
Composite Prices	This Week	Week Ago	Month Ago	Year Ago
Finished Steel base (Cents per lb)	6.196	6.196	6.196	6.196
Pig Iron (Gross ton)	$66.44	$66.44	$66.44	$66.41
Scrap No. 1 hvy (Gross ton)	$39.50	$39.50	$37.83	$31.83
No 2 bundles	$26.50	$26.17	$24.50	$22.17

Bearings Market Is Firming

Buyers of bearings may not notice it yet, but the market is firming up.

Deliveries may soon be extended. And there is the chance that prices will rise in the near future.

▪ Right now bearings buyers probably notice only a slight firming in the market.

But bearings makers report new orders are gaining rapidly. If the trend continues, and many believe it will accelerate, longer deliveries can be expected. Also, prices might climb.

Here's the picture:

Bearings makers had a very flat first half. The consensus is that business was just slightly better than the last half of 1960. But the demand was still well below capacity. So, at the first harbinger of improvement many bearings makers started putting in some finished inventories.

No Strain — It has been these stocks that have kept the strain off the market to date.

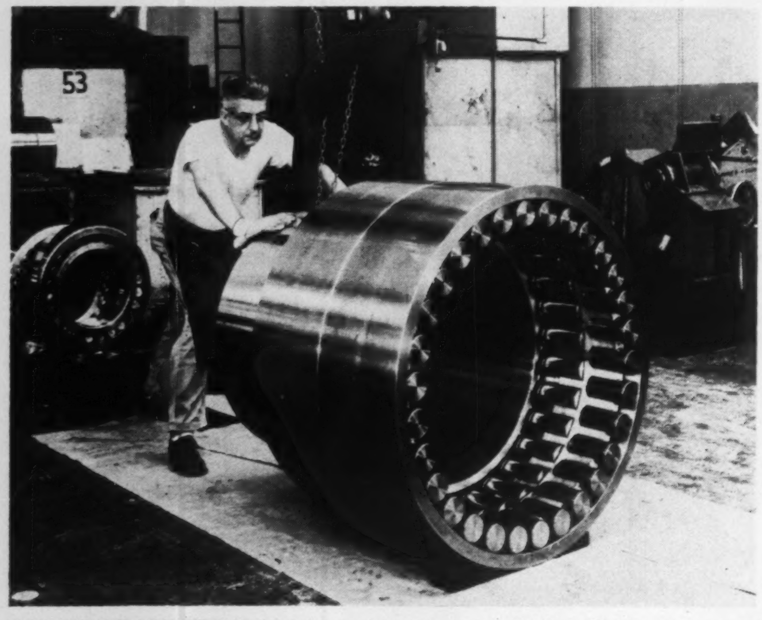
Business started a slow upturn in May. It leveled off during the summer, and started up again—more sharply—about mid-August.

One company reports spherical ball bearings and tapered ball bearings, more for replacement markets than original equipment, are its fastest moving items.

Another says that in the last few weeks it has been forced to extend deliveries of light bearings, mostly for light industrial and consumer equipment, from the previous 4 to 6 weeks to 8 to 10 weeks.

Average?—The sales chief of this company figures this hasn't cost him any orders. So it must be at least as good as the industry average.

Foreign bearings are not likely to be much help in this tightening market. Some quality problems have been reported on bearings that have been competing in the U. S. on price. And a seller of a line of German bearings, priced on a par with U. S. products, says he is having problems getting the bearings.



ORDERS ROLLING IN: Makers of bearings report that the slump appears to be over. They say buyers have liquidated stocks as far as possible.

In fact, European demand for U. S. bearings has picked up. This, figures the sales chief of one company, is mostly from U. S. subsidiaries long established in a foreign country. They have been buying their bearings locally. But they now find they can't get what they want, when they want it.

Liquidation — Another factor which may serve to squeeze the market, according to a bearings man: During the first half of 1961, buyers may have been using more bearings than they were buying. He figures this inventory liquidation has gone about as far as it can.

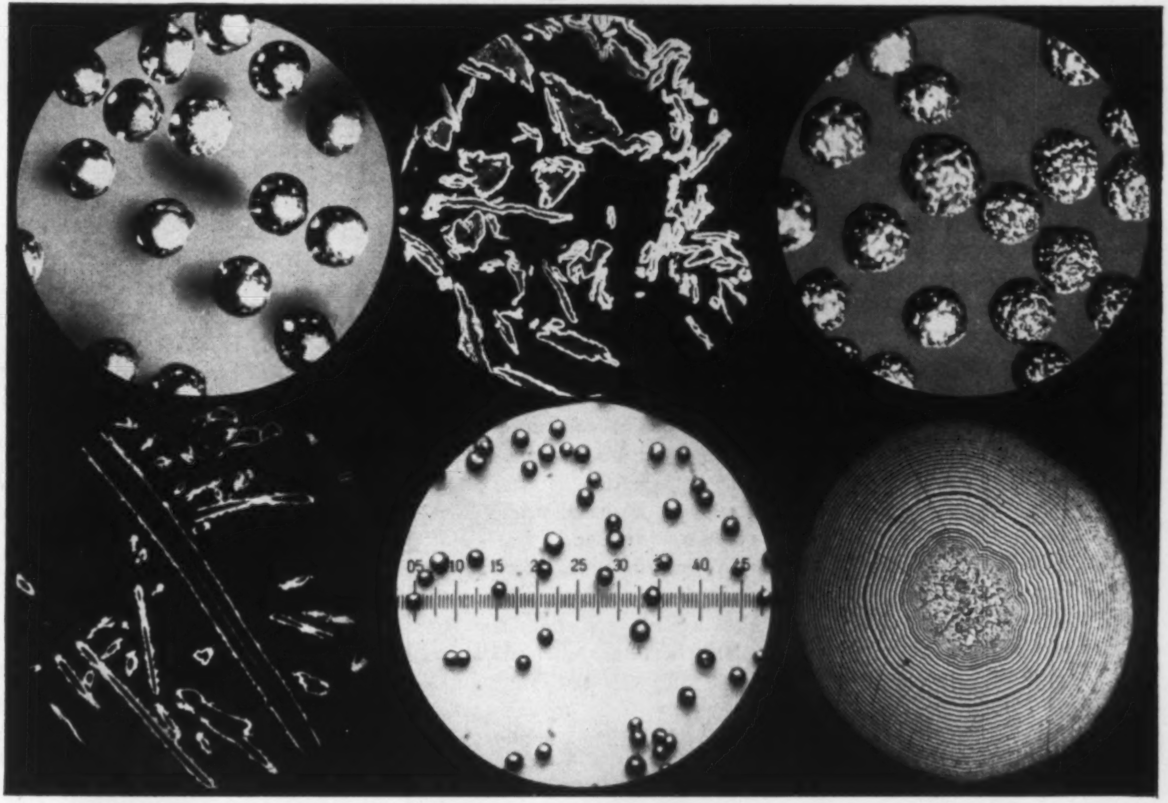
The price picture is somewhat confused. SKF Industries, Inc., Philadelphia bearings maker with a very wide line, announced its September price hike several months in advance. Everyone was skeptical. And many buyers felt they would have little trouble making SKF back down.

But business improved and the price hike stood. In fact, it was subsequently backed up by several other major bearings makers.

Small Hikes — However, one bearings maker reports these hikes were very small. And he says that during the business drought late in 1960 and early this year prices of some of the most popular items were cut sharply.

"The overall price pattern is well below what it was 18 months ago," says this bearings maker. There seems little doubt that he is thinking in terms of higher prices, perhaps just for selected, fast-moving items when the market will justify it.

For metallurgists with imagination . . .



An important advance in metal powders!

Clad powders with metal and non-metal cores open the way to new materials and technologies!

Out of the laboratory and into commercial use comes a concept that promises to advance metal powder technology.

Composite powders—made by Sherritt's patented process—consist of finely divided metal or non-metal particles coated with nickel or cobalt. The composition of these particles can be controlled to produce a wide range of materials with improved or unusual properties.

Composites with metallic cores include nickel-aluminum and nickel-tungsten. Various grades of graphite have been coated with nickel. High phosphorus alloys—not easily formed by conventional methods—are readily prepared with nickel or cobalt as the cladding. Carbides of tungsten, titanium, tantalum, chromium and silicon, and oxides such as alumina, silica, zirconia are used as core materials. Even ceramics and fibrous materials, such as asbestos and alumina-silica wool, have given good results. And, most recent of all, are coated-plastic powders, such as Teflon* coated with nickel.

Applications range from electrical resistance alloys, controlled expansion alloys and hard facing alloys to welding rods, permanent magnets, cemented carbides, bonded abrasive tools, and many others.

How will these metal-coated powders improve *your* processing or your products? What new uses will you make of them? If clad powders spark your imagination—or your curiosity—write our Technical Literature Department for free Booklet, "Metal and Composite Powders." Or, ask a Sherritt Contact Metallurgist to call. Address request to Marketing Division, Sherritt Gordon Mines Ltd., 25 King St. West, Toronto, Canada.

*Du Pont Trademark

SHERRITT GORDON MINES LIMITED

Inventory Building Picks Up Speed

While not widespread, more steel users are moving to increase their stocks.

Service centers are among those interested in beefing up inventories.

- Inventory rebuilding hasn't yet become widescale, but it's growing. What's more, users not yet buying for stock are doing more thinking about it.

"Customers are asking more and more questions about the delivery situation," says one mill sales official. "They are checking on lead times, asking about any move toward a stretchout in deliveries."

Why Buyers Worry—The same man points out buyers are stepping up the tonnage on present orders. This reflects increased steel demand, but also indicates more interest in enlarging stocks.

Buyer concern about deliveries may be justified. Sheet products, despite the present auto shutdowns, are holding up well. In the Midwest, flat-rolled products, including hot-rolled sheet, are on six weeks delivery. Warehouses there have been trying to move October tonnage up into September, some unsuccessfully.

Plate deliveries are also moving out, with some Eastern mills at about five weeks on sheared mill products.

When the auto steel picture clears, inventory building, especially in sheet and bar products, will probably increase. Among factors responsible will be improved demand, some thinking ahead to possible steel shortages next summer, and hedging against any mill price increases.

Specialty Steel — Armco Steel Corp. sees a number of important specialty steels moving up into the tonnage class. However, the company feels these gaps will be filled by new commercial specialties coming out of defense programs and research laboratories.

With this belief in the specialty steel field, Armco is banking heavily on it. The company has spent $80 million modernizing its Butler, Pa. works. All this has been for equipment designed strictly for specialty steel output.

At the same time, Logan Johnston and other Armco officials say there are decisive transitions for aluminized stainless, and electrical steels. These products are seen going into volume markets or being affected by trends toward volume steels.

Others Agree—Aluminized steels have accounted for 25 pct of the Butler plant's output. Two lines at Butler have aluminizing capacity of 75,000 tons. Now, Armco is providing 100,000 tons of capacity at Middletown, O. Mr. Johnston feels aluminized sheet is definitely ready for the tonnage class.

Mr. Johnston claims aluminum-coated steel offers a three-to-one advantage over galvanized in the matter of corrosion resistance. He cites its use in auto mufflers as an indication of a tonnage market.

This thinking has received some backing from other producers. United States Steel Corp. is providing for aluminum coating, as well as zinc, in the line scheduled for the Gary, Ind. works. Space is provided for aluminizing in another major zinc-coating installation.

Sheet and Strip—Mills are marking time on deliveries to the auto industry until the labor situation clears up. Even so, the market is strengthening, with October orders generally above September for many producers.

As far as automotive steel is concerned, there have been requests to delay steel shipments, but no cancellations. However, if the auto shut-downs continue for more than a week, cutbacks are considered inevitable.

Even with the auto market uncertainty, sheet deliveries are lengthening, especially at **Chicago** area mills.

Plate—Bookings continue more plentiful for mills, with the emphasis on buying at **East Coast** mills. Sheared mill plate deliveries there are running 3 to 5 weeks, with some mills more active than others. At **Cleveland,** plates are available in 4 to 6 weeks without any trouble.

Tinplate — Mill shipments to users are holding up fairly well in September. New orders point to a drop in the fourth quarter. With price hedge buying a factor, the October decline may not be as sharp as in past years. However, producers expect some tapering off in sales.

Pipe and Tubing — Oil country seamless is doing fairly well in September. Sizes below 20 in. are moving well to refineries and construction users in the **Cleveland** area. Sales are better, but large field inventories of pipe are still on the market.

Wire Products — Order volume continues to improve, although seasonal factors are now exerting an influence. Wiremakers expect output to move up about 5 points in October, giving the industry a production rate of 65 to 70 pct.

PURCHASING AGENT'S CHECKLIST

Fastener sales and shipments move up sharply.	P. 66
How to take the guesswork out of forming.	P. 93
Can materials-handling equipment rental pay off?	P. 96

COMPARISON OF PRICES

(Effective Sept. 18, 1961)

Steel prices on this page are the average of various f.o.b. quotations of major producing areas: Pittsburgh, Chicago, Gary, Cleveland, Youngstown.

Price changes from previous week are shown by an asterisk (*).

	Sept. 18 1961	Sept. 11 1961	Aug. 21 1961	Sept. 20 1960
Flat-Rolled Steel: (per pound)				
Hot-rolled sheets	5.10¢	5.10¢	5.10¢	5.10¢
Cold-rolled sheets	6.275	6.275	6.275	6.275
Galvanized sheets (10 ga.)	6.875	6.875	6.875	6.875
Hot-rolled strip	5.10	5.10	5.10	5.10
Cold-rolled strip	7.425	7.425	7.425	7.425
Plate	5.30	5.30	5.30	5.30
Plates, wrought iron	14.10	14.10	14.10	14.10
Stainl's C-R strip (No. 302)	49.50	49.50	52.00	52.00
Tin and Terneplate: (per base box)				
Tin plates (1.50 lb.) cokes	$10.65	$10.65	$10.65	$10.65
Tin plates, electro (0.50 lb.)	9.35	9.35	9.35	9.35
Special coated mfg. ternes	9.90	9.90	9.90	9.90
Bars and Shapes: (per pound)				
Merchant bar	5.675¢	5.675¢	5.675¢	5.675¢
Cold finished bar	7.65	7.65	7.65	7.65
Alloy bar	6.725	6.725	6.725	6.725
Structural shapes	5.50	5.50	5.50	5.50
Stainless bars (No. 302)	46.75	46.75	46.75	46.75
Wrought iron bars	14.90	14.90	14.90	14.90
Wire: (per pound)				
Bright wire	8.00¢	8.00¢	8.00¢	8.00¢
Rails: (per 10 lb.)				
Heavy rails	$5.75	$5.75	$5.75	$5.75
Light rails	6.725	6.725	6.725	6.725
Semifinished Steel: (per net ton)				
Rerolling billets	$80.00	$80.00	$80.00	$80.00
Slabs, rerolling	80.00	80.00	80.00	80.00
Forging billets	99.50	99.50	99.50	99.50
Alloys, blooms, billets, slabs	119.00	119.00	119.00	119.00
Wire Rods and Skelp: (per pound)				
Wire rods	6.49¢	6.40¢	6.40¢	6.40¢
Skelp	5.05	5.05	5.05	5.05
Finished Steel Composite: (per pound)				
Base price	6.196¢	6.196¢	6.196¢	6.196¢

	Sept. 18 1961	Sept. 11 1961	Aug. 21 1961	Sept. 20 1960
Pig Iron: (per gross ton)				
Foundry, del'd Phila.	$70.68	$70.68	$70.68	$70.57
Foundry, South Cin'ti.	71.92	71.92	71.92	73.87
Foundry, Birmingham	62.50	62.50	62.50	62.50
Foundry, Chicago	66.50	66.50	66.50	66.50
Basic, del'd Philadelphia	70.11	70.11	70.11	70.07
Basic Valley furnace	66.00	66.00	66.00	66.00
Malleable, Chicago	66.50	66.50	66.50	66.50
Malleable, Valley	66.50	66.50	66.50	66.50
Ferromanganese 74-76 pct Mn. cents per lb‡	11.00	11.00	11.00	11.00
Pig Iron Composite: (per gross ton)				
Pig iron	$66.44	$66.44	$66.44	$66.41
Scrap: (per gross ton)				
No. 1 steel, Pittsburgh	$37.50	$37.50	$35.50	$31.50
No. 1 steel, Phila. area	40.50	40.50	39.50	34.50
No. 1 steel, Chicago	40.50	40.50	38.50	29.50
No. 1 bundles, Detroit	35.50	35.50	35.50	28.50
Low phos., Youngstown	43.50	43.50	41.50	34.50
No. 1 mach'y cast. Pittsburgh	45.50	45.50	45.50	47.50
No. 1 mach'y cast. Phila.	49.50	49.50	49.50	49.50
No. 1 mach'y cast. Chicago	50.50	50.50	49.50	45.50
Steel Scrap Composite: (per gross ton)				
No. 1 hvy. melting scrap	$39.50	$39.50	$37.83	$31.83
No. 2 bundles	26.50*	26.17	24.50	22.17
Coke, Connellsville: (per net ton at oven)				
Furnace coke, prompt	$14.75-15.50	14.75-15.50	14.75-15.50	14.75-15.50
Foundry coke, prompt	18.50	18.50	18.50	18.50
Nonferrous Metals: (cents per pound to large buyers)				
Copper, electrolytic, Conn.	$31.00	$31.00	$31.00	$33.00
Copper, Lake, Conn.	31.00	31.00	31.00	33.00
Tin, Straits, N. Y.	120.50†	120.75**	119.00	102.00
Zinc, East St. Louis	11.50	11.50	11.50	13.00
Lead, St. Louis	11.00	11.00	11.00	11.80
Aluminum, ingot	26.00	26.00	26.00	26.00
Nickel, electrolytic	74.00	74.00	74.00	74.00
Magnesium, ingot	36.00	36.00	36.00	36.00
Antimony, Laredo, Tex.	29.50	29.50	29.50	29.50

† Tentative. ‡ Average. ** Revised.

Finished Steel Composite

Weighted index of steel bars, shapes, plates, wire, rails, black pipe, hot and cold rolled sheets and strips.

Pig Iron Composite

Based on averages for basic iron at Valley furnaces and foundry iron at Chicago, Philadelphia, Buffalo and Birmingham.

Steel Scrap Composite

Average of No. 1 heavy melting steel scrap and No. 2 bundles delivered to consumers at Pittsburgh, Philadelphia and Chicago.

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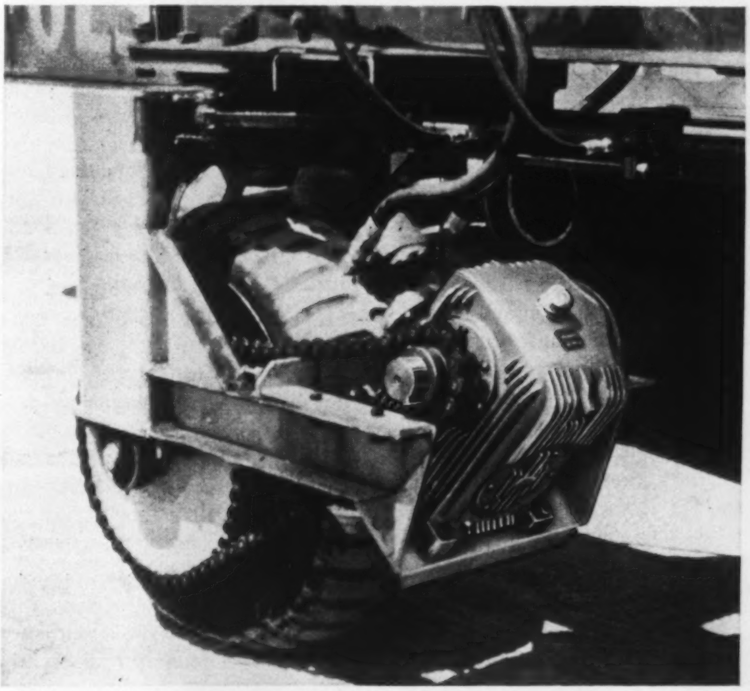
*Appears in the Sept. 14-Sept. 28 issues.

(Advertisement)



STURGEON BAY, Wisc. Manufacturer solves drive problem for traveling crane by mounting hydraulic motor-driven speed reducer at wheel. Double-enveloping worm gear design permits compact unit necessary for application. Available from Cone-Drive Gears, Div. Michigan Tool Co., 7171 E. McNichols Road, Detroit 12, Michigan.

Japanese Order Less Scrap This Quarter

Japanese have cut their fourth quarter scrap by about 35 pct from the third quarter.

But there are reports that the East Coast will get a larger chunk of the order than it did during the last quarter.

▪ The Japanese have placed their order for the fourth quarter. It works out to about 65 cargoes. However, this is about 35 pct less scrap than they took during the third quarter.

Optimism rose on the East Coast on reports that a larger part of the order would be placed there this time. But, on the same report, pessimism set in on the West Coast. In the end, price will likely determine distribution of orders. Right now, the East Coast price is a little more attractive, some brokers say.

Mixed Reaction — The brighter prospect for the East brought a strengthening at Boston and a firming at New York. But fewer cargoes caused a mixed reaction at Philadelphia where brokers indicated they would let orders set the mood.

The smaller Japanese order was disappointing—but not entirely unexpected. They had bought heavily in the first half. And there is still congestion at some ports in Japan where unloading facilities are poor.

Pittsburgh—The market here is still firm, but there has been no increase in buying volume. Price of No. 2 bundles is up $1 on the basis of purchases by a local mill at $27. Late railroad lists followed the trend of earlier offerings. Prices moved up $1 to $2. A Valley price of $42 to the dealer is pulling prime scrap from this district. Brokers say it would be impossible to buy No. 1 heavy melting today at $38, the last price paid locally.

Chicago—With no heavy mill action, the market remained firm on small purchases by a number of consumers of both steelmaking and foundry grades. Growing strength continues among foundry buyers. No. 1 machinery cast listings were inadvertently omitted for several weeks. Correct prices for issues of Aug. 31 and Sept. 7 are $49-50; for the issues of Sept. 14 and 21 are $50-51.

Philadelphia — The market is steady to firm. But there is little agreement as to just how strong the market really is. The Japanese have ordered about 65 cargoes for the fourth quarter. Another point: Some local mills are pressing for heavier shipments; others are fairly inactive.

New York—This market is definitely stronger. In fact, one dealer says it has "turned the corner." New prices for steelmaking grades, raised on appraisal last week, were quickly confirmed. Export demand continues good. And dealers are optimistic on what they expect the Japanese to do in the next quarter. Word is expected soon.

Detroit—There are reports that the openhearth market is settling a bit, while the foundry business has shown a little more spirit recently. Scrap offering will be very large in October—if current auto industry labor problems are cleared away.

Cleveland—The market has a strong undertone, although most activity is in small shipments of special grades. Dealers will sell only small amounts at present prices. Brokers must pay higher prices to get dealer scrap to replace auto scrap lost by strikes.

Cincinnati—The market has hit a momentary lull. It's waiting for bidding on October lists. Increased local prices are keeping scrap at home. But it will probably take an additional boost to do it again next month.

St. Louis—Prices are unchanged this week. However, there is a strong undertone to the market. Movement of scrap is good. The cooler weather is expected to help boost collections. Only cast grades show any signs of weakness.

Birmingham — An electric furnace mill raised its prices $2 per ton last week. It placed September orders for No. 1 busheling, electric furnace bundles, and electric furnace steel. An Atlanta consumer, however, purchased No. 2 heavy melting at unchanged prices.

Buffalo—Prices advanced $2 this week on some grades as pressure from outside markets continues. Small quantities of cast scrap were sold locally at quoted levels.

Boston—Prices on just about all key grades moved up this week. Dealers are optimistic about the outlook. More orders for Japan are anticipated this quarter.

West Coast—The domestic market is quiet. Prices are firm. The trade is concerned that a bigger share of Japanese orders for the next quarter will go to East Coast ports. If they do, some dealers say it would weaken the market.

Houston—Hurricane Carla hampered activities here. Export shipping was halted temporarily. Mill operations were curtailed. But the area market was strengthened when a mill in east Texas came into the market, paying $2 over local prices.

SCRAP PRICES *(Effective Sept. 17, 1961)*

Iron and Steel Scrap

Going prices of iron and steel scrap as obtained in the trade by THE IRON AGE based on representative tonnages. All prices are per gross ton delivered to consumer unless otherwise noted.

Pittsburgh

No. 1 hvy. melting	$37.00 to $38.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	38.00 to 39.00
No. 1 factory bundles	47.00 to 48.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	37.00 to 38.00
Machine shop turn.	15.00 to 16.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	19.00 to 20.00
Low phos. punch'gs plate	45.00 to 46.00
Heavy turnings	32.00 to 33.00
No. 1 RR hvy. melting	43.00 to 44.00
Scrap rails, random lgth.	46.00 to 47.00
Rails 2 ft and under	52.00 to 53.00
RR specialties	48.00 to 49.00
No. 1 machinery cast.	45.00 to 46.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	33.00 to 34.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	155.00 to 120.00
430 bundles and solids.	85.00 to 90.00
410 turnings	55.00 to 60.00

Chicago

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	41.00 to 42.00
No. 1 factory bundles	45.00 to 46.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	19.00 to 20.00
Mixed bor. and turn.	20.00 to 21.00
Shoveling turnings	22.00 to 23.00
Cast iron borings	21.00 to 22.00
Low phos. forge crops	50.00 to 51.00
Low phos. punch'gs plate, ¼ in. and heavier	48.00 to 49.00
Low phos. 2 ft and under	46.00 to 47.00
No. 1 RR hvy. melting	44.00 to 45.00
Scrap rails, random lgth.	50.00 to 51.00
Rerolling rails	62.00 to 63.00
Rails 2 ft and under	53.00 to 54.00
Angles and splice bars	48.00 to 49.00
RR steel car axles	61.00 to 62.00
RR couplers and knuckles.	48.00 to 49.00
No. 1 machinery cast.	50.00 to 51.00
Cupola cast.	44.00 to 45.00
Cast iron wheels	36.00 to 37.00
Malleable	49.00 to 50.00
Stove plate	38.00 to 39.00
Steel car wheels	47.00 to 48.00
Stainless	
18-8 bundles and solids	190.00 to 195.00
18-8 turnings	110.00 to 115.00
430 bundles and solids.	95.00 to 100.00
430 turnings	55.00 to 60.00

Philadelphia Area

No. 1 hvy. melting	$40.00 to $41.00
No. 2 hvy. melting	36.00 to 37.00
No. 1 dealer bundles	43.00 to 44.00
No. 2 bundles	26.00 to 27.00
No. 1 busheling	42.00 to 43.00
Machine shop turn.	13.00 to 14.00
Mixed bor. short turn.	16.00 to 17.00
Cast iron borings	14.00 to 15.00
Shoveling turnings	19.00 to 20.00
Clean cast. chem. borings.	29.00 to 30.00
Low phos. 5 ft and under.	43.00 to 45.00
Low phos. 2 ft punch'gs.	45.00 to 46.00
Elec. furnace bundles	44.00 to 45.00
Heavy turnings	27.00 to 28.00
RR specialties	44.00 to 45.00
Rails, 18 in. and under	52.00 to 54.00
Cupola cast.	39.00 to 40.00
Heavy breakable cast.	41.00 to 42.00
Cast iron car wheels	42.00 to 43.00
Malleable	48.00 to 49.00
No. 1 machinery cast.	49.00 to 50.00

Cincinnati

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00 to $36.00
No. 2 hvy. melting	29.00 to 30.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	22.00 to 23.00
Machine shop turn.	9.00 to 10.00
Shoveling turnings	14.00 to 15.00
Cast iron borings	14.00 to 15.00
Low phos. 18 in. and under	42.00 to 43.00
Rails, random length	42.00 to 43.00
Rails, 18 in. and under	47.00 to 48.00
No. 1 cupola cast.	33.00 to 34.00
Heavy breakable cast.	30.00 to 31.00
Drop broken cast.	44.00 to 45.00

Youngstown

No. 1 hvy. melting	$41.00 to $42.00
No. 2 hvy. melting	28.50 to 29.50
No. 1 dealer bundles	41.00 to 42.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	17.00 to 18.00
Shoveling turnings	19.00 to 20.00
Low phos. plate	43.00 to 44.00

Cleveland

No. 1 hvy. melting	$38.50 to $39.50
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	38.50 to 39.50
No. 1 factory bundles	43.00 to 44.00
No. 2 bundles	22.50 to 23.50
No. 1 busheling	38.50 to 39.50
Machine shop turn.	15.00 to 16.00
Mixed bor. and turn.	18.00 to 19.00
Shoveling turnings	18.00 to 19.00
Cast iron borings	18.00 to 19.00
Cut structural & plates, 2 ft & under	42.00 to 43.00
Low phos. punch'gs plate.	39.50 to 40.50
Drop forge flashings	38.50 to 39.50
Foundry steel, 2 ft & under	36.00 to 37.00
No. 1 RR hvy. melting	42.50 to 43.50
Rails 2 ft and under	49.00 to 50.00
Rails 18 in. and under	52.00 to 53.00
Steel axle turnings	28.00 to 29.00
Railroad cast.	48.00 to 49.00
No. 1 machinery cast.	48.00 to 49.00
Stove plate	40.00 to 41.00
Malleable	52.00 to 53.00
Stainless	
18-8 bundles	180.00 to 185.00
18-8 turnings	105.00 to 110.00
430 bundles	85.00 to 90.00

Buffalo

No. 1 hvy. melting	$33.00 to $34.00
No. 2 hvy. melting	26.00 to 27.00
No. 1 busheling	33.00 to 34.00
No. 1 dealer bundles	33.00 to 34.00
No. 2 bundles	24.00 to 25.00
Machine shop turn.	13.00 to 14.00
Mixed bor. and turn.	14.00 to 15.00
Cast iron borings	15.00 to 16.00
Low phos. plate	39.00 to 40.00
Structural and plate, 2 ft and under	41.00 to 42.00
Rails 2 ft and under	50.00 to 51.00
Scrap rails, random lgth.	40.00 to 41.00
No. 1 machinery cast.	43.00 to 44.00
No. 1 cupola cast.	37.00 to 38.00

St. Louis

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
Foundry steel, 2 ft.	33.00 to 34.00
No. 1 dealer bundles	36.00 to 37.00
No. 2 bundles	26.00 to 27.00
Machine shop turn.	16.50 to 17.50
Shoveling turnings	18.50 to 19.50
Cast iron borings	26.00 to 27.00
No. 1 RR hvy. melting	40.00 to 41.00
Rails, random lengths	43.00 to 44.00
Rails, 18 in. and under	46.00 to 47.00
RR specialties	43.00 to 44.00
Cupola cast.	37.00 to 38.00
Heavy breakable cast.	32.00 to 33.00
Stove plate	32.00 to 33.00
Cast iron car wheels	34.00 to 35.00
Rerolling rails	56.00 to 57.00
Unstripped motor blocks.	34.00 to 35.00

Birmingham

No. 1 hvy. melting	$38.00 to $39.00
No. 2 hvy. melting	30.00 to 31.00
No. 1 dealer bundles	38.00 to 39.00
No. 2 bundles	21.00 to 22.00
No. 1 busheling	40.00 to 41.00
Machine shop turn.	18.00 to 19.00
Shoveling turnings	20.00 to 21.00
Cast iron borings	10.00 to 11.00
Electric furnace bundles.	40.00 to 41.00
Elec. furnace, 3 ft & under	38.00 to 39.00
Bar crops and plate	45.00 to 46.00
Structural and plate, 2 ft.	44.00 to 45.00
No. 1 RR hvy. melting	39.00 to 40.00
Scrap rail, random lgth.	42.00 to 43.00
Rails, 18 in. and under	46.00 to 47.00
Angles and splice bars	44.00 to 45.00
No. 1 cupola cast.	42.00 to 43.00
Stove plate	42.00 to 43.00
Cast iron car wheels	34.00 to 35.00
Unstripped motor blocks	31.00 to 32.00

New York

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$31.00 to $32.00
No. 2 hvy. melting	25.00 to 26.00
No. 2 dealer bundles	19.00 to 20.00
Mixed. bor. and turn.	5.00 to 6.00
Machine shop turnings	5.00 to 6.00
Shoveling turnings	7.00 to 8.00
Clean cast. chem. borings.	19.00 to 20.00
No. 1 machinery cast.	38.00 to 39.00
Mixed yard cast.	34.00 to 35.00
Heavy breakable cast.	32.00 to 33.00
Stainless	
18-8 prepared solids	160.00 to 165.00
18-8 turnings	80.00 to 85.00
430 prepared solids	65.00 to 70.00
430 turnings	20.00 to 25.00

Detroit

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$36.00 to $37.00
No. 2 hvy. melting	31.00 to 32.00
No. 1 dealer bundles	35.00 to 36.00
No. 2 bundles	22.00 to 23.00
No. 1 busheling	34.00 to 35.00
Drop forge flashings	34.00 to 35.00
Machine shop turn.	12.00 to 13.00
Mixed bor. and turn.	15.00 to 16.00
Shoveling turnings	16.00 to 17.00
Cast iron borings	15.00 to 16.00
Heavy breakable cast.	28.00 to 29.00
Mixed cupola cast.	31.00 to 32.00
Automotive cast.	41.00 to 42.00
Stainless	
18-8 bundles and solids.	175.00 to 180.00
18-8 turnings	80.00 to 85.00
430 bundles and solids.	70.00 to 75.00

Boston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$28.00 to $29.00
No. 2 hvy. melting	25.00 to 26.00
No. 1 dealer bundles	31.50 to 32.50
No. 2 bundles	19.00 to 20.00
No. 1 busheling	31.50 to 32.50
Machine shop turn.	4.00 to 5.00
Shoveling turnings	8.50 to 9.00
Clean cast. chem. borings.	17.50 to 18.50
No. 1 machinery cast.	38.00 to 39.00
Mixed cupola cast.	30.00 to 31.00
Heavy breakable cast.	30.50 to 31.50

San Francisco

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 1 dealer bundles	33.00
No. 2 bundles	$25.00 to 26.00
Machine shop turn.	17.00
Cast iron borings	17.00
No. 1 cupola cast.	50.00

Los Angeles

No. 1 hvy. melting	$44.00
No. 2 hvy. melting	41.00
No. 1 dealer bundles	33.00
No. 2 bundles	$25.00 to 26.00
Machine shop turn.	16.00
Shoveling turnings	16.00
Cast iron borings	16.00
Elec. furnace 1 ft and under (foundry)	52.00
No. 1 cupola cast.	47.00 to 48.00

Seattle

No. 1 hvy. melting	$45.00
No. 2 hvy. melting	42.00
No. 2 bundles	$26.00 to 27.00
No. 1 cupola cast.	36.00 to 37.00
Mixed yard cast.	31.00 to 32.00

Hamilton, Ont.

Brokers buying prices per net ton on cars:

No. 1 hvy. melting	$30.00
No. 2 hvy. melting cut 3 ft and under	27.00
No. 1 dealer bundles	31.00
No. 2 bundles	23.50
Mixed steel scrap	22.00
Bush., new fact., prep'd.	30.00
Bush., new fact., unprep'd	24.00
Machine shop turn.	8.00
Short steel turn.	12.00
Mixed bor. and turn.	12.00
Cast scrap	32.00

Houston

Brokers buying prices per gross ton on cars:

No. 1 hvy. melting	$35.00
No. 2 hvy. melting	33.00
No. 2 bundles	24.00
Machine shop turn.	10.00
Shoveling turnings	13.00
Cut structural plate 2 ft & under	$44.00 to 45.00
Unstripped motor blocks.	28.00 to 29.00
Cupola cast.	36.00 to 37.00
Heavy breakable cast.	28.00 to 29.00

U.S. Sale Of Tin Shakes Market

Many are upset by the news that the U. S. will try to sell some of its huge tin stock.

Malaya, the International Tin Council, and speculators are all miffed.

▪ The news that General Services Administration will try to sell some of the government's huge hoard of tin hit a few nerves surprisingly hard.

The Malayan government quickly "regretted" the move. Its main contention: The current high range of tin prices likely will coax back some high-cost Malayan mines into production and cure the expected shortage. Spokesmen imply that with the 50,000 tons hanging over the market (the amount to be sold) these marginal operators are less likely to take the chance.

International Reaction — There wasn't much the International Tin Council could say because: 1. The U. S. is not a member, and 2. ITC stocks, which are generally sold when prices start moving away, are depleted.

But sources say the ITC people leave no doubt they are miffed at the move. They had been concerned about the huge U. S. stocks and had approached the U. S. government to discuss the situation.

Price Drop—Traders and speculators are unhappy. The best indication was the immediate drop in tin prices on both continents.

Some sellers in the U. S. are mumbling that this is a bad precedent. They feel it might start the U. S. government on the road to where it would eventually be controlling the prices of all metals with stockpiles.

But the law calls for a six-month waiting period after GSA gets the necessary Congressional approval before metal can be sold. And there is doubt that GSA can push through this approval before Congress adjourns.

GSA is not likely to point toward driving the market down. It has already rejected bids on 1000 tons of tin because they were too low.

Unlikely Dump—GSA is also not very likely to dump the whole 50,000 tons of stockpile tin on the market at one time.

It has asked for a waiver from Congress on the six-month waiting period on 10,000 tons. It is likely to spread the total distribution over several years.

Still another factor—Bolivia is dead set against anything that would disturb the current high range of tin prices. Observers in Washington note that past performance indicates the State Dept. is likely to throw heavy weight against anything that would strain our South American relations.

Stock Cleaning — The whole weight of evidence points to this explanation: GSA leaders simply want to clean out some of their now useless stocks. And when would be a better time than now? The markets are "extremely favorable to the disposition of a portion of our extremely expensive excess inventories of tin?"

Many in the industry are recognizing this. Edward Boustead & Co., Ltd., of London, traders, say. "In our view, the recent fall (tin prices) has been overdone."

Unstable Market—Why the panicky reactions? Observers say it shows how unstable the market is.

The reaction also indicates the number of speculators in the market starting to get a little nervous. And the Malayan feeling indicates these people know the market could come down rapidly.

A snowball fall is unlikely.

The general feeling is that tin prices are not likely to go much higher.

Consensus: Prices in the U. S. are not likely to drop below $1.15 per lb for at least six months, probably longer.

Beryllium

Beryllium Corp., Reading, Pa., hiked prices for beryllium alloy wrought and cast products by 2 pct on September 18. The increase covered beryllium copper strip, rod, bar, wire, billets and beryllium-magnesium - aluminum, beryllium nickel, and beryllium copper ingots.

Tin Prices for the Week

September 12—120.75; September 13—121.50; September 14—121.00; September 15—121.00; September 18—120.50.*

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* Estimate.

Primary Prices

(cents per lb.)	current price	last price	date of change
Aluminum Ingot	26.00	24.70	12/17/59
Copper (E)	31.00	30.00	5/16/61
Copper (CS)	31.00	30.00	5/17/61
Copper (L)	31.00	30.00	5/17/61
Lead, St. L.	10.80	11.80	12/13/60
Lead, N. Y.	11.00	12.00	12/13/60
Magnesium Ingot	36.00	34.50	8/13/56
Magnesium pig	35.25	33.75	8/13/56
Nickel	81.25	74.00	6/30/61
Titanium sponge	150-160	162-182	8/1/59
Zinc, E. St. L.	11.50	12.50	1/12/61
Zinc, N. Y.	12.00	13.00	1/12/61

ALUMINUM: 99% Ingot. COPPER: (E) = electrolytic, (CS) = custom smelters, electrolytic. (L) = lake. LEAD: common grade. MAGNESIUM: 99.8% pig Velasco, Tex. NICKEL: Port Colborne, Canada. ZINC: prime western. Other primary prices, pg. 131.

MILL PRODUCTS

(Cents per lb unless otherwise noted)

ALUMINUM

(Base 30,000 lb, f.o.b. customer's plant)

Flat Sheet (Mill Finish and Plate)

("F" temper except 6061-0)

Alloy	.030-.037	.047-.060	.076-.096	.154-.250
1100, 3003	48.4	47.4	46.4	45.4
5052	55.8	53.0	50.8	47.8
6061-0	53.0	50.3	48.4	47.0

Extruded Solid Shapes

Factor	6063 T-5	6062 T-6
1-17	45.3-46.8	54.0-61.8
18-32	45.8-47.5	58.6-81.5
33-38	49.5-52.2	85.1-96.6
39-44	59.8-63.6	102.0-124.0

Screw Machine Stock—2011-T-3

Size"	7/32-5/16	11/32-23/32	3/4-1 1/16	1 3/32-1 1/2
Price	60.0	59.2	57.7	55.3

Roofing Sheet, Corrugated

(Per sheet, 26" wide base, 16,000 lb)

Length"→	72	96	120	144
.019 gage	$1.506	$2.013	$2.515	$3.017

MAGNESIUM

(F.o.b. shipping pt., carload frt. allowed)

Sheet and Plate

Type↓ Gage→	.250 3.00	.250- 2.00	.188	.081	.032
AZ31B Stand, Grade	......	67.9	69.0	77.9	103.1
AZ31B Spec.	......	93.3	96.9	108.7	171.3
Tread Plate	......	70.6	71.7	......	......
Tooling Plate	73.0	......	......	......	......

Extruded Shapes

factor→	6-8	12-14	24-26	36-38
Comm. Grade. (AZ31C)	65.3	65.3	66.1	71.5
Spec. Grade... (AZ31B)	84.6	85.7	90.6	104.2

Alloy Ingot

AZ91B (Die Casting)	37.25 (delivered)
AZ63A, AZ92A, AZ91C (Sand Casting)	40.75 (Velasco, Tex.)

NICKEL, MONEL, INCONEL

(Base prices f.o.b. mill)

	"A" Nickel	Monel	Inconel
Sheet, CR	147	126	145
Strip, CR	133	114	145
Rod, bar, HR	116	95	116
Angles, HR	116	95	116
Plates, HR	139	116	133
Shot, blocks	...	93	...

COPPER, BRASS, BRONZE

(Freight included in 5000 lbs)

	Sheet	Wire	Rod	Tube
Copper	56.13	....	53.61	57.32
Brass, Yellow	49.27	49.56	49.21	53.43
Brass, Low	52.15	52.44	52.09	56.21
Brass, Rod	53.17	53.46	53.11	57.23
Brass, Naval	53.94	60.25	47.75	58.10
Muntz Metal	51.94	....	47.25	....
Comm. Bz.	54.73	55.02	54.67	58.34
Mang. Bz.	57.71	61.54	51.27	....
Phos. Bz. 5%	76.97	76.72	77.47	78.90

Free Cutting Brass Rod 34.77

TITANIUM

(Base 30,000 lb. f.o.b. customer's plant)

Sheet and strip, commercially pure, $6.75-$13.00; alloy, $13.40-$17. Plate HR, commercially pure, $5.25-$9.00; alloy, $8.00-$10.00. Wire, rolled and/or drawn, commercially pure, $5.55-$6.05; alloy, $5.55-$9.00; bar, HR or forged commercially pure, $4.00-$4.50; alloy, $4.00-$6.25; billets, HR, commercially pure, $3.20-$3.70; alloy, $3.20-$4.75.

PRIMARY METAL

(Cents per lb unless otherwise noted)

Antimony, American, Laredo, Tex.	32.50
Beryllium Aluminum 5% Be, Dollars per lb contained Be	$ 5.00
Beryllium copper, per lb conta'd Be	$43.00
Beryllium 97% lump or beads, f.o.b. Cleveland, Reading	$70.00
Bismuth, ton lots	$ 2.25
Cadmium, del'd	$ 1.70
Calcium, 99.9% small lots	$ 4.55
Chromium, 99.8% metallic base	$ 1.31
Cobalt, 97-99% (per lb)	$1.50 to $ 1.57
Germanium, per gm, f.o.b. Miami, Okla., refined	$29.95 to $36.95
Gold, U. S. Treas., per troy oz.	$35.00
Indium, 99.9% dollars per troy oz.	$ 2.25
Iridium, dollars per troy oz.	$75 to $85
Lithium, 98%	$9.00 to $12.00
Magnesium sticks, 10,000 lb.	57.00
Mercury dollars per 76-lb flask f.o.b. New York	$188 to $191
Nickel oxide sinter at Buffalo, N. Y. or other U. S. points of entry, contained nickel	77.50
Palladium, dollars per troy oz.	$24 to $26
Platinum, dollars per troy oz.	$82 to $85
Rhodium	$137 to $140
Silver ingots (¢ per troy oz.)	91.375
Thorium, per pg	$43.00
Vanadium	$ 3.65
Zirconium sponge	$ 5.00

REMELTED METALS

Brass Ingot

(Cents per lb delivered, carloads)

85-5-5 ingot	
No. 115	32.00
No. 120	31.25
No. 123	30.50
80-10-10 ingot	
No. 305	36.00
No. 315	33.75
88-10-2 ingot	
No. 210	43.75
No. 215	40.50
No. 245	35.75
Yellow ingot	
No. 405	27.50
Manganese bronze	
No. 421	31.25

Aluminum Ingot

(Cents per lb del'd 30,000 *lb and over)*

95.5 aluminum-silicon alloys	
0.30 copper max.	23.25-23.75
0.60 copper max.	23.00-23.50
Piston alloys (No. 132 type)	25.00-26.00
No. 12 alum. (No. 2 grade)	21.25-21.75
108 alloy	21.75-22.25
195 alloy	24.25-24.75
13 alloy (0.60 copper max.)	23.00-23.50
AXS-679 (1 pct zinc)	21.50-22.50

Steel deoxidizing aluminum notch bar granulated or shot

Grade 1—95-97½%	22.75-23.75
Grade 2—92-95%	21.50-22.50
Grade 3—90-92%	20.50-21.50
Grade 4—85-90%	19.50-20.50

SCRAP METALS

Brass Mill Scrap

(Cents per pound, add 1¢ per lb for shipments of 20,000 lb and over)

	Heavy	Turnings
Copper	27	26¼
Yellow brass	20⅜	18½
Red brass	23⅞	23⅛
Comm. bronze	24¾	24
Mang. bronze	19¼	18½
Free cutting rod ends	19½	

Customs Smelters Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	28¼
No. 2 copper wire	26¼
Light copper	24
*Refining brass	25
Copper bearing material	24

*Dry Copper content.

Ingot Makers Scrap

(Cents per pound carload lots, delivered to refinery)

No. 1 copper wire	28¼
No. 2 copper wire	26¼
Light copper	24
No. 1 composition	25½
No. 1 comp. turnings	24½
Hvy. yellow brass solids	19½
Heavy yellow brass turnings	18
Radiators	20½
Aluminum	
Mixed old cast.	12½—13
Mixed new clips	14½—15
Mixed turnings, dry	13 —14

Dealers' Scrap

(Dealers' buying price f.o.b. New York in cents per pound)

Copper and Brass

No. 1 copper wire	24½—25
No. 2 copper wire	22½—23
Light copper	20¼—20¾
Auto radiators (unsweated)	16½—17
No. 1 composition	21¼—21¾
No. 1 composition turnings	20¾—21¼
Cocks and faucets	17¼—17¾
Clean heavy yellow brass	15¼—15½
Brass pipe	17¼—17¾
New soft brass clippings	18¾—19¼
No. 1 brass rod turnings	16½—17

Aluminum

Alum. pistons and struts	7 — 7½
Aluminum crankcase	9½—10
1100 (2s) aluminum clippings	11¾—12¼
Old sheet and utensils	9½—10
Boring and turnings	4½— 5
Industrial castings	10 —10½
2020 (24s) clippings	11 —11½

Zinc

New zinc clippings	5 — 5¼
Old zinc	3 — 3¼
Zinc routings	1¾— 2
Old die cast scrap	1¾— 2

Nickel and Monel

Pure nickel clippings	56 —58
Clean nickel turnings	43
Nickel anodes	56 —58
Nickel rod ends	56 —58
New Monel clippings	26 —26½
Clean Monel turnings	18½—19
Old sheet Monel	25 —25½
Nickel silver clippings, mixed	20
Nickel silver turnings, mixed	17

Lead

Soft scrap lead	7¼— 7½
Battery plates (dry)	3 — 3¼
Batteries, acid free	2 — 2¼

Miscellaneous

Block tin	90 —92
No. 1 pewter	65 —67
Auto babbitt	46 —47
Mixed common babbitt	10 —10½
Solder joints	15 —15½
Small foundry type	9 — 9½
Monotype	9¼— 9¾
Lino. and stereotype	8½— 8¾
Electrotype	8 — 8¼
Hand picked type shells	5¾— 6¼
Lino. and stereo. dross	1¾— 2¼
Electro dross	2½— 3

(Effective Sept. 18, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BILLETS, BLOOMS, SLABS			PIL-ING	SHAPES, STRUCTURALS			STRIP					
		Carbon Rerolling Net Ton	Carbon Forging Net Ton	Alloy Net Ton	Sheet Steel	Carbon	Hi Str. Low Alloy	Carbon Wide-Flange	Hot-rolled	Cold-rolled	Hi Str. H.R. Low Alloy	Hi Str. C.R. Low Alloy	Alloy Hot-rolled	Alloy Cold-rolled
EAST	Bethlehem, Pa.			$119.00 *B3*		5.55 *B3*	8.10 *B3*	5.55 *B5*						
	Buffalo, N. Y.	$80.00 *R3, B3*	$99.50 *R3, B3*	$119.00 *R3, B3*	6.50 *B3*	5.55 *B3*	8.10 *B3*	5.55 *B3*	5.10 *B3,*	7.425 *S10, R7*	7.575 *B3*			
	Phila., Pa.									7.875 *P15*				
	Harrison, N. J.													15.55 *C11*
	Conshohocken, Pa.		$99.50 *A2*	$121.00 *A2*					5.15 *A2*		7.575 *A2*			
	New Bedford, Mass.									7.875 *R6*				
	Johnstown, Pa.	$80.00 *B3*	$99.50 *B3*	$119.00 *B3*		5.55 *B3*	8.10 *B3*							
	Boston, Mass.									7.975 *T8*				15.90 *T8*
	New Haven, Conn.									7.875 *D1*				
	Baltimore, Md.									7.425 *T8*				15.90 *T8*
	Phoenixville, Pa.					5.55 *P2*	8.10 *P2*	5.55 *P2*						
	Sparrows Pt., Md.								5.10 *B3*		7.575 *B3*			
	New Britain, Wallingford, Conn.			$119.00 *N8*						7.875 *W1,S7*				
	Pawtucket, R. I. Worcester, Mass.									7.975 *N7, A5*				15.90 *N7* 15.70 *T8*
MIDDLE WEST	Alton, Ill.								5.30 *L1*					
	Ashland, Ky.								5.10 *A7*		7.575 *A7*			
	Canton-Massillon, Dover, Ohio		$102.00 *R3*	$119.00 *R3, T5*						7.425 *G4*		10.80 *G4*		
	Chicago, Franklin Park, Evanston, Ill.	$80.00 *U1, R3*	$99.50 *U1, R3,W8*	$119.00 *U1, R3,W8*	6.50 *U1*	5.50 *U1, W8,P13*	8.05 *U1, Y1,W8*	5.50 *U1*	5.10 *W8, N4,A1*	7.425 *A1,T8, M8* 7.525* *M8*	7.575 *W8*		8.40 *W8, S9,I3*	15.55 *A1, S9,G4,T8*
	Cleveland, Ohio									7.425 *A5*		10.75 *A5*	8.40 *J3*	15.60 *N7*
	Detroit, Mich.			$119.00 *R5*					5.10 *G3, M2*	7.425 *M2, S1, D1, P11, B9*	7.575 *G3*	10.80 *S1*		
	Anderson, Ind.									7.425 *G4*				
	Gary, Ind. Harbor, Indiana	$80.00 *U1*	$99.50 *U1*	$119.00 *U1, Y1*		5.50 *U1, I3, Y1*	8.05 *U1, J3*	5.50 *I3*	5.10 *U1, I3,Y1*	7.425 *Y1*	7.575 *U1, I3,Y1*	10.90 *Y1*	8.40 *U1, Y1*	
	Sterling, Ill.	$80.00 *N4*				5.50 *N4*	7.75 *N4*	5.50 *N4*	5.20 *N4*					
	Indianapolis, Ind.									7.575 *R5*				15.70 *R5*
	Newport, Ky.								5.10 *A9*				8.40 *A9*	
	Niles, Warren, Struthers, Ohio Sharon, Pa.		$99.50 *S1, C10*	$119.00 *C10,S1*		5.50 *Y1*			5.10 *R3, S1*	7.425 *R3, T4,S1*	7.575 *R3, S1*	10.80 *R3, S1*	8.40 *S1*	15.55 *S1*
	Owensboro, Ky.	$80.00 *G5*	$99.50 *G5*	$119.00 *G5*										
	Pittsburgh, Midland, Butler, Aliquippa, N. Castle, McKeesport, Pa.	$80.00 *U1, P6*	$99.50 *U1, C11,P6*	$119.00 *U1, C11,B7*	6.50 *U1*	5.50 *U1, J3*	8.05 *U1, J3*	5.50 *U1*	5.10 *P6*	7.425 *B4, M10*			8.40 *S9*	15.55 *S9* 15.60 *N7*
	Weirton, Wheeling, Follansbee, W. Va.				6.50 *U1, W3*	5.50 *W3*		5.50 *W3*	5.10 *W3*	7.425 *W5*	7.575 *W3*	10.80 *W3*		
	Youngstown, Ohio	$80.00 *R3*	$99.50 *Y1, C10*	$119.00 *Y1*			8.05 *Y1*		5.10 *U*	7.425 *Y1,R5*	7.575 *U1, Y1*	10.95 *Y1*	8.40 *U1, Y1*	15.55 *R5, Y1*
WEST	Fontana, Cal.	$90.50 *K1*	$109.00 *K1*	$140.00 *K1*		6.30 *K1*	8.85 *K1*	6.45 *K1*	5.825 *K1*	9.20 *K1*				
	Geneva, Utah		$99.50 *C7*			5.50 *C7*	8.05 *C7*							
	Kansas City, Mo.					5.60 *S2*	8.15 *S2*						8.65 *S2*	
	Los Angeles, Torrance, Cal.		$109.00 *B2*	$139.00 *B2*		6.20 *C7, B2*	8.75 *B2*		5.85 *C7, B2*	9.30 *C1,R5*			9.60 *B2*	17.75 *J3*
	Minnequa, Colo.					5.80 *C6*			6.20 *C6*	9.375 *C6*				
	Portland, Ore.					6.25 *O2*								
	San Francisco, Niles, Pittsburg, Cal.		$109.00 *B2*			6.15 *B2*	8.70 *B2*		5.85 *C7, B2*					
	Seattle, Wash.		$109.00 *B2*	$140.00 *B2*		6.25 *B2*	8.80 *B2*		6.10 *B2*					
SOUTH	Atlanta, Ga.					5.70 *A8*			5.10 *A8*					
	Fairfield, Ala. Birmingham, Ala.	$80.00 *T2*	$99.50 *T2*			5.50 *T2 R3,C16*	8.05 *T2*		5.10 *T2, R3,C16*		7.575 *T2*			
	Houston, Lone Star, Texas		$104.50 *S2*	$124.00 *S2*		5.60 *S2*	8.15 *S2*						8.65 *S2*	

* Electro-galvanized-plus galvanizing extras

(Effective Sept. 18, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		SHEETS								WIRE ROD	TINPLATE†		
		Hot-rolled *18* ga. & hvyr.	Cold-rolled	Galvanized (Hot-dipped)	Electro-galvanized	Enameling	Long Terne	Hi Str. Low Alloy H.R.	Hi Str. Low Alloy C.R.		Cokes▲ *1.25*-lb. base box	Electro▲▲ *0.25*-lb. base box	Thin *0.25* lb. coating in coils
EAST	Buffalo, N. Y.	5.10 *B3*	6.275 *B3*					7.525 *B3*	9.275 *B3*	6.40 *W6, S15*	†Special coated mfg. terne deduct 35¢ from 1.25-lb. coke base box price 0.75 lb./0.25 lb. add 55¢. Can-making quality BLACKPLATE 55 to 128 lb. deduct $2.20 from 1.25 lb. coke base box. ▲ COKES: 1.50-lb. add 25¢. ▲▲ELECTRO: 0.50-lb. add 25¢; 0.75-lb. add 65¢; 1.00-lb. add $1.00. Differential 1.00 lb./0.25 lb. add 65¢.		Prices are for 50 lb. base box; for 45 lb. deduct 15¢; for 55 lb. add 15¢; for 60 lb. add 30¢.
	Claymont, Del.												
	Coatesville, Pa.												
	Conshohocken, Pa.	5.15 *A2*	6.325 *A2*					7.575 *A2*					
	Harrisburg, Pa.												
	Hartford, Conn.												
	Johnstown, Pa.									6.40 *B3*			
	Fairless, Pa.	5.15 *U1*	6.325 *U1*					7.575 *U1*	9.325 *U1*			$9.10 *U1*	$6.25 *U1*
	New Haven, Conn.												
	Phoenixville, Pa.												
	Sparrows Pt., Md.	5.10 *B3*	6.275 *B3*	6.875 *B3*		6.775 *B3*		7.525 *B3*	9.275 *B3* 10.025 *B3**	6.50 *B3*	$10.40 *B3*	$9.10 *B3*	$6.25 *B3*
	Worcester, Mass.									6.70 *A5*			
MIDDLE WEST	Alton, Ill.									6.60 *L1*	**Hollowware Enameling** 29 ga.—*7.85 U1* at Gary; Pittsburgh; *J3* at Aliquippa; *W5* at Yorkville; *Y1* at Indiana Harbor; *W5* at Wheeling; *7.95 G2* at Granite City.		
	Ashland, Ky.	5.10 *A7*		6.875 *A7*		6.775 *A7*		7.525 *A7*					
	Canton-Massillon, Dover, Canfield, Ohio			6.875 *R1, R3*	7.50 *C19*								
	Chicago, Joliet, Ill.	5.10 *W8, A1*						7.525 *U1, W8*		6.40 *A5, R3,W8*			
	Sterling, Ill.									6.50 *N4, K2*			
	Cleveland, Ohio	5.10 *R3, J3*	6.275 *R3, J3*		7.65 *R3*	6.775 *R3*		7.525 *R3, J3*	9.275 *R3, J3*	6.40 *A5*			
	Detroit, Mich.	5.10 *G3, M2*	6.275 *G3, M2*					7.525 *G3*	9.275 *G3*				
	Newport, Ky.	5.10 *A9*	6.275 *A9*										
	Gary, Ind. Harbor, Indiana	5.10 *U1, I3,Y1*	6.275 *U1, I3,Y1*	6.875 *U1, I3*		6.775 *U1, I3,Y1*	7.225 *U1*	7.525 *U1, Y1,I3*	9.275 *U1, Y1*	6.40 *Y1*	$10.40 *U1, Y1*	$9.10 *I3, U1Y1,*	$6.25 *U1,I3*
	Granite City, Ill.	5.20 *G2*	6.375 *G2*	6.975 *G2*								$9.20 *G2*	
	Kokomo, Ind.			6.975 *C9*						6.50 *C9*			
	Mansfield, Ohio	5.10 *E2*	6.275 *E2*				7.225 *E2*						
	Middletown, Ohio		6.275 *A7*	6.875 *A7*	7.225 *A7*	6.775 *A7*	7.225 *A7*						
	Niles, Warren, Ohio Sharon, Pa.	5.10 *R3, S1*	6.275 *R3*	6.875 *R3*	7.65 *R3*	6.775 *S1*	7.225 *S1*†† *R3*	7.525 *R3, S1*	9.275 *R3*			$9.10 *R3*	
	Pittsburgh, Midland, Butler, Aliquippa, McKeesport, Pa.	5.10 *U1, J3,P6*	6.275 *U1, J3,P6*	6.875 *U1, J3*	7.50 *E3*	6.775 *U1*		7.525 *U1, J3*	9.275 *U1, J3* 10.125 *U1, J3**	6.40 *A5, J3,P6*	$10.40 *U1, J3*	$9.10 *U1, J3*	$6.25 *U1, J3*
	Portsmouth, Ohio	5.10 *P7*	6.275 *P7*							6.40 *P7*			
	Weirton, Wheeling, Follansbee, W. Va.	5.10 *W3, W5*	6.275 *W3, F3,W5*	6.875 *W3, W5*	7.50 *W3*		7.225 *W3*	7.525 *W3*	9.275 *W3*		$10.40 *W5, W3*	$9.10 *W5, W3*	$6.40 *W5*** $6.25 *W3*
	Youngstown, Ohio	5.10 *U1, Y1*	6.275 *Y1*			6.775 *Y1*		7.525 *Y1*	9.275 *Y1*	6.40 *Y1*			
WEST	Fontana, Cal.	5.825 *K1*	7.40 *K1*					8.25 *K1*	10.40 *K1*		$11.05 *K1*	$9.75 *K1*	
	Geneva, Utah	5.20 *C7*											
	Kansas City, Mo.									6.65 *S2*			
	Los Angeles, Torrance, Cal.									7.20 *B2*			
	Minnequa, Colo.									6.65 *C6*			
	San Francisco, Niles, Pittsburg, Cal.	5.80 *C7*	7.225 *C7*	7.625 *C7*						7.20 *C7*	$11.05 *C7*	$9.75 *C7*	
SOUTH	Atlanta, Ga.												
	Fairfield, Ala. Alabama City, Ala.	5.10 *T2, R3*	6.275 *T2, R3*	6.875 *T2, R3*		6.775 *T2*				6.40 *T2,R3*	$10.40 *T2*	$9.10 *T2*	$6.25 *T2*
	Houston, Texas									6.65 *S2*			

* Hi Str. Low Alloy Galv. ** For 55 lb.; for 60 lb. add 15¢.

†† 7.425 at Sharon; Niles is 7.225.

(Effective Sept. 18, 1961)

IRON AGE

STEEL PRICES

Italics identify producers listed in key at end of table. Base prices, f.o.b. mill, in cents per lb., unless otherwise noted. Extras apply.

		BARS						PLATES				WIRE
		Carbon† Steel	Reinforcing	Cold Finished	Alloy Hot-rolled	Alloy Cold Drawn	Hi Str. H.R. Low Alloy	Carbon Steel	Floor Plate	Alloy	Hi Str. Low Alloy	Mfr's. Bright
EAST	Bethlehem, Pa.				6.725 *B3*	9.025 *B3*	8.30 *B3*					
	Buffalo, N. Y.	5.675 *R3,B3, S15*	Listing reinforcing bar prices has been suspended. Major producers now quote prices only in response to specific inquiries.	7.70 *B5*	6.725 *B3,R3, S15*	9.025 *B3,B5, S15*	8.30 *B3*	5.30 *B3*				8.00 *W6, S15*
	Claymont, Del.							5.30 *P2*	6.375 *P2*	7.50 *P2*	7.95 *P2*	
	Coatesville, Pa.							5.30 *L4*		7.50 *L4*	7.95 *L4*	
	Conshohocken, Pa.							5.30 *A2*	6.375 *A2*	7.50 *A2*	7.95 *A2*	
	Milton, Pa.	5.825 *M7*										
	Hartford, Conn.			8.15 *R3*		9.325 *R3*						
	Johnstown, Pa.	5.675 *B3*			6.725 *B3*		8.30 *B3*	5.30 *B3*		7.50 *B3*	7.95 *B3*	8.00 *B3*
	Steelton, Pa.											
	Fairless, Pa.	5.825 *U1*										
	Newark, Camden, N. J.			8.10 *W10, P10*		9.20 *W10, P10*						
	Bridgeport, Putnam, Willimantic, Conn.			8.20 *W10* 8.15 *J3*	6.80 *N8*	9.175 *N8*						
	Sparrows Pt., Md.							5.30 *B3*		7.50 *B3*	7.95 *B3*	8.10 *B3*
	Palmer, Worcester, Readville, Mansfield, Mass.			8.20 *B5, C14*		9.325 *A5,B5*						8.30 *A5, W6*
	Spring City, Pa.			8.10 *K4*		9.20 *K4*						
MIDDLE WEST	Alton, Ill.	5.875 *L1*										8.20 *L1*
	Ashland, Newport, Ky.							5.30 *A7, A9*		7.50 *A9*	7.95 *A7*	
	Canton, Massillon, Mansfield, Ohio	6.15* *R3*		7.65 *R3,R2*	6.725 *R3, T5*	9.025 *R3,R2, T5*		5.30 *E2*				
	Chicago, Joliet, Waukegan, Madison, Harvey, Ill.	5.675 *U1,R3, W8,N4,P13*		7.65 *A5, W10,W8, B5,L2,N9*	6.725 *U1,R3, W8*	9.025 *A5, W10,W8, L2,N8,B5*	8.30 *U1,W8, R3*	5.30 *U1,A1, W8,I3*	6.375 *U1*	7.50 *U1, W8*	7.95 *U1, W8*	8.00 *A5,R3, W8,N4, K2,W7*
	Cleveland, Elyria, Ohio	5.675 *R3*		7.65 *A5,C13, C18*		9.025 *A5, C13,C18*	8.30 *R3*	5.30 *R3,J3*	6.375 *J3*		7.95 *R3,J3*	8.00 *A5, C13,C18*
	Detroit, Plymouth, Mich.	5.675 *G3*		7.90 *P3* 7.85 *P8 B5 H2* 7.65 *R5*	6.725 *R5,G3*	9.025 *R5,P8, H2* 9.225 *B5,P3*	8.30 *G3*	5.30 *G3*		7.50 *G3*	7.95 *G3*	
	Duluth, Minn.											8.00 *A5*
	Gary, Ind. Harbor, Crawfordsville, Hammond, Ind.	5.675 *U1,I3, Y1*		7.65 *R3,J3*	6.725 *U1,I3, Y1*	9.025 *R3,M4*	8.30 *U1,Y1*	5.30 *U1,I3, Y1*	6.375 *J3, Y1*	7.50 *U1, Y1*	7.95 *U1, Y1,I3*	8.10 *M4*
	Granite City, Ill.							5.40 *G2*				
	Kokomo, Ind.											8.10 *C9*
	Sterling, Ill.	5.775 *N4*					7.925 *N4*	5.30 *N4*			7.625 *N4*	8.10 *K2*
	Niles, Warren, Ohio Sharon, Pa.			7.65 *C10*	6.725 *C10,*	9.025 *C10*		5.30 *R3,S1*		7.50 *S1*	7.95 *R3, S1*	
	Owensboro, Ky.	5.675 *G5*			6.725 *G5*							
	Pittsburgh, Midland, Donora, Aliquippa, Pa.	5.675 *U1,J3*		7.65 *A5,B4, R3,J3,C11, W10,S9,C8, M9*	6.725 *U1,J3, C11,B7*	9.025 *A5, W10,R3,S9, C11,C8,M9*	8.30 *U1,J3*	5.30 *U1,J3*	6.375 *U1,J3*	7.50 *U1, J3,B7*	7.95 *U1, J3,B7*	8.00 *A5, J3,P6*
	Portsmouth, Ohio											8.00 *P7*
	Youngstown, Steubenville, O.	5.675 *U1,R3, Y1*		7.65 *A1,Y1, F2*	6.725 *U1,Y1*	9.025 *Y1,F2*	8.30 *U1,Y1*	5.30 *U1,W5, R3,Y1*		7.50 *Y1*	7.95 *U1,Y1*	8.00 *Y1*
WEST	Emeryville, Fontana, Cal.	6.375 *K1*			7.775 *K1*		9.00 *K1*	6.10 *K1*		8.30 *K1*	8.75 *K1*	
	Geneva, Utah							5.30 *C7*			7.95 *C7*	
	Kansas City, Mo.	5.925 *S2*			6.975 *S2*		8.55 *S2*					8.25 *S2*
	Los Angeles, Torrance, Cal.	6.375 *C7,B2*		9.10 *R3,P14, S12*	7.775 *B2*	11.00 *P14, B5*	9.00 *B2*					8.95 *B2*
	Minnequa, Colo.	6.125 *C6*						6.15 *C6*				8.25 *C6*
	Portland, Ore.	6.425 *O2*										
	San Francisco, Niles, Pittsburg, Cal.	6.375 *C7* 6.425 *B2*					9.05 *B2*					8.95 *C7,C6*
	Seattle, Wash.	6.425 *B2,N6, A10*			7.825 *B2*		9.05 *B2*	6.20 *B2*		8.40 *B2*	8.85 *B2*	
SOUTH	Atlanta, Ga. Jacksonville, Fla.	5.875 *A8*										8.00 *A8* 8.35 *M4*
	Fairfield, Ala. Birmingham, Ala.	5.675 *T2,R3, C16*		8.10 *C16*			8.30 *T2*	5.30 *T2,R3*			7.95 *T2*	8.00 *T2,R3*
	Houston, Ft. Worth, Lone Star, Texas, Sand Springs, Okla.	5.925 *S2*			6.975 *S2*		8.55 *S2*	5.40 *S2*		7.60 *S2*	8.05 *S2*	8.25 *S2*

† Merchant Quality—Special Quality 35¢ higher.

(Effective Sept. 18, 1961)

* Special Quality.

STEEL PRICES

Key to Steel Producers

With Principal Offices

A1	Acme Steel Co., Chicago
A2	Alan Wood Steel Co., Conshohocken, Pa.
A3	Allegheny Ludlum Steel Corp., Pittsburgh
A4	American Cladmetals Co., Carnegie, Pa.
A5	American Steel & Wire Div., Cleveland
A6	Angel Nail & Chaplet Co., Cleveland
A7	Armco Steel Corp., Middletown, Ohio
A8	Atlantic Steel Co., Atlanta, Ga.
A9	Acme-Newport Steel Co., Newport, Ky.
A10	Alaska Steel Mills, Inc., Seattle, Wash.
B1	Babcock & Wilcox Tube Div., Beaver Falls, Pa.
B2	Bethlehem Steel Co., Pacific Coast Div.
B3	Bethlehem Steel Co., Bethlehem, Pa.
B4	Blair Strip Steel Co., New Castle, Pa.
B5	Bliss & Laughlin, Inc., Harvey, Ill.
B6	Brooke Plant, Wickwire Spencer Steel Div., Birdsboro, Pa.
B7	A. M. Byers, Pittsburgh
B8	Braeburn Alloy Steel Corp., Braeburn, Pa.
B9	Barry Universal Corp., Detroit, Mich.
C1	Calstrip Steel Corp., Los Angeles
C2	Carpenter Steel Co., Reading, Pa.
C6	Colorado Fuel & Iron Corp., Denver
C7	Columbia Geneva Steel Div., San Francisco
C8	Columbia Steel & Shafting Co., Pittsburgh
C9	Continental Steel Corp., Kokomo, Ind.
C10	Copperweld Steel Co., Pittsburgh, Pa.
C11	Crucible Steel Co. of America, Pittsburgh
C13	Cuyahoga Steel & Wire Co., Cleveland
C14	Compressed Steel Shafting Co., Readville, Mass.
C15	G. O. Carlson, Inc., Thorndale, Pa.
C16	Connors Steel Div., Birmingham
C18	Cold Drawn Steel Plant, Western Automatic Machine Screw Co., Elyria, O.
C19	Canfield Steel Co., Canfield, O.
D1	Detroit Steel Corp., Detroit
D2	Driver, Wilbur B., Co., Newark, N. J.
D3	Driver Harris Co., Harrison, N. J.
D4	Dickson Weatherproof Nail Co., Evanston, Ill.
E1	Eastern Stainless Steel Corp., Baltimore
E2	Empire Reeves Steel Corp., Mansfield, O.
E3	Enamel Products & Plating Co., McKeesport, Pa.
F1	Firth Sterling, Inc., McKeesport, Pa.
F2	Fitzsimons Steel Corp., Youngstown
F3	Follansbee Steel Corp., Follansbee, W. Va.
G2	Granite City Steel Co., Granite City, Ill.
G3	Great Lakes Steel Corp., Detroit
G4	Greer Steel Co., Dover, O.
G5	Green River Steel Corp., Owenboro, Ky.
H1	Hanna Furnace Corp., Detroit
H2	Hercules Drawn Steel Corp., Toledo, O.
I2	Ingersoll Steel Div., New Castle, Ind.
I3	Inland Steel Co., Chicago, Ill.
I4	Interlake Iron Corp., Cleveland
J1	Jackson Iron & Steel Co., Jackson, O.
J2	Jessop Steel Corp., Washington, Pa.
J3	Jones & Laughlin Steel Corp., Pittsburgh
J4	Joslyn Mfg. & Supply Co., Chicago
J5	Judson Steel Corp., Emeryville, Calif.
K1	Kaiser Steel Corp., Fontana, Calif.
K2	Keystone Steel & Wire Co., Peoria
K4	Keystone Drawn Steel Co., Spring City, Pa.
L1	Laclede Steel Co., St. Louis
L2	La Salle Steel Co., Chicago
L3	Lone Star Steel Co., Dallas
L4	Lukens Steel Co., Coatesville, Pa.
M1	Mahoning Valley Steel Co., Niles, O.
M2	McLouth Steel Corp., Detroit
M3	Mercer Tube & Mfg. Co., Sharon, Pa.
M4	Mid States Steel & Wire Co., Crawfordsville, Ind.
M7	Milton Steel Products Div., Milton, Pa.
M8	Mill Strip Products Co., Evanston, Ill.
M9	Moltrup Steel Products Co., Beaver Falls, Pa.
M10	Mill Strip Products Co., of Pa., New Castle, Pa.
N1	National Supply Co., Pittsburgh
N2	National Tube Div., Pittsburgh
N4	Northwestern Steel & Wire Co., Sterling, Ill.
N6	Northwest Steel Rolling Mills, Seattle
N7	Newman Crosby Steel Co., Pawtucket, R. I.
N8	Carpenter Steel of New England, Inc., Bridgeport, Conn.
N9	Nelson Steel & Wire Co.
O1	Oliver Iron & Steel Co., Pittsburgh
O2	Oregon Steel Mills, Portland
P1	Page Steel & Wire Div., Monessen, Pa.
P2	Phoenix Steel Corp., Phoenixville, Pa.
P3	Pilgrim Drawn Steel Div., Plymouth, Mich.
P4	Pittsburgh Coke & Chemical Co., Pittsburgh
P6	Pittsburgh Steel Co., Pittsburgh
P7	Portsmouth Div., Detroit Steel Corp., Detroit
P8	Plymouth Steel Co., Detroit
P9	Pacific States Steel Co., Niles, Cal.
P10	Precision Drawn Steel Co., Camden, N. J.
P11	Production Steel Strip Corp., Detroit
P13	Phoenix Mfg. Co., Joliet, Ill.
P14	Pacific Tube Co.
P15	Philadelphia Steel and Wire Corp.
R1	Reeves Steel & Mfg. Div., Dover, O.
R2	Reliance Div., Eaton Mfg. Co., Massillon, O.
R3	Republic Steel Corp., Cleveland
R4	Roebling Sons Co., John A., Trenton, N. J.
R5	Jones & Laughlin Steel Corp., Stainless and Strip Div.
R6	Rodney Metals, Inc., New Bedford, Mass.
R7	Rome Strip Steel Co., Rome, N. Y.
S1	Sharon Steel Corp., Sharon, Pa.
S2	Sheffield Steel Div., Kansas City
S3	Shenango Furnace Co., Pittsburgh
S4	Simonds Saw and Steel Co., Fitchburg, Mass.
S5	Sweet's Steel Co., Williamsport, Pa.
S7	Stanley Works, New Britain, Conn.
S8	Superior Drawn Steel Co., Monaca, Pa.
S9	Superior Steel Div. of Copperweld Steel Co
S10	Seneca Steel Service, Buffalo
S11	Southern Electric Steel Co., Birmingham
S12	Sierra Drawn Div., Bliss & Laughlin, Inc., Los Angeles, Calif.
S13	Seymour Mfg. Co., Seymour, Conn.
S14	Screw and Bolt Corp. of America, Pittsburgh, Pa.
S15	Seaway Steel Div., Roblin-Seaway Ind., Inc., North Tonawanda, N. Y.
T1	Tonawanda Iron Div., N. Tonawanda, N. Y.
T2	Tennessee Coal & Iron Div., Fairfield
T3	Tennessee Products & Chem. Corp., Nashville
T4	Thomas Strip Div., Warren, O.
T5	Timken Steel & Tube Div., Canton, O.
T7	Texas Steel Co., Fort Worth
T8	Thompson Wire Co., Boston
U1	United States Steel Corp., Pittsburgh
U2	Universal Cyclops Steel Corp., Bridgeville, Pa.
U3	Ulbrich Stainless Steels, Wallingford, Conn.
U4	U. S. Pipe & Foundry Co., Birmingham
W1	Wallingford Steel Co., Wallingford, Conn.
W2	Washington Steel Corp., Washington, Pa.
W3	Weirton Steel Co., Weirton, W. Va.
W4	Wheatland Tube Co., Wheatland, Pa.
W5	Wheeling Steel Corp., Wheeling, W. Va.
W6	Wickwire Spencer Steel Div., Buffalo
W7	Wilson Steel & Wire Co., Chicago
W8	Wisconsin Steel Div., S. Chicago, Ill.
W9	Woodward Iron Co., Woodward, Ala.
W10	Wyckoff Steel Co., Pittsburgh
W12	Wallace Barnes Steel Div., Bristol, Conn.
Y1	Youngstown Sheet & Tube Co., Youngstown, O.

STEEL SERVICE CENTER PRICES

Metropolitan Price, dollars per 100 lb.

Cities		Sheets			Strip	Plates	Shapes	Bars		Alloy Bars			
	City Delivery‡ Charge	Hot-Rolled (18 ga. & hvr.)	Cold-Rolled (15 gage)	Galvanized (10 gage)††	Hot-Rolled		Standard Structural	Hot-Rolled (merchant)	Cold-Finished	Hot-Rolled 4615 As rolled	Hot-Rolled 4140 Annealed	Cold-Drawn 4615 As rolled	Cold-Drawn 4140 Annealed
Atlanta		9.37	10.61	11.83	10.85	9.73	9.94	9.53	13.24	......	......	......	......
Baltimore	$.10	9.60	10.16	10.16	11.35	9.70	9.95	8.65	11.80	17.48	16.48	21.58	20.83
Birmingham		8.46	10.20	10.59	9.45	8.41	8.47	8.26	13.14	18.84	16.65	22.94	22.19
Boston**	.10	10.00	10.50	11.62	12.50	9.95	10.60	10.15	13.45	17.69	16.69	21.79	21.04
Buffalo**	.15	9.45	10.20	11.95	11.85	9.55	10.05	9.60	11.60	17.45	16.45	21.55	20.80
Chicago**	.15	9.37	10.35	10.28	11.54	9.21	9.72	9.37	10.80	17.10	16.10	21.20	20.45
Cincinnati**	.15	9.53	10.41	10.33	11.86	9.59	10.29	9.48	11.68	17.42	16.42	21.52	20.77
Cleveland**	.15	9.37[1]	10.81	11.07	11.66	9.45	10.11	9.48	11.40	17.21	16.21	21.31	20.56
Denver		11.55	12.53	13.03	13.72	11.39	11.90	11.55	12.98	......	......	......	20.84
Detroit**	.15	9.63	10.61	10.65	11.91	9.58	10.29	9.68	11.16	17.38	16.38	21.48	20.73
Houston**		8.67	9.48	11.35[3]	10.23	8.20	8.31	8.08	13.10	17.50	16.55	21.55	20.85
Kansas City	.15	10.53	11.37	10.95	12.70	10.39	10.91	10.55	11.72	17.17	15.87	21.87	21.12
Los Angeles		10.35[1]	12.15	12.10	12.40	10.30	10.45	10.25	14.20	18.30	17.35	22.90	22.20
Memphis	.15	9.78	10.50	10.95	11.44	9.47	9.82	9.67	12.85	18.59	16.68	22.69	21.04
Milwaukee**	.15	9.51	10.49	10.42	11.68	9.35	9.94	9.51	11.04	17.24	16.24	21.34	20.59
New York**	.10	10.17	10.88	11.45	12.47	10.32	11.00	10.54	13.35	17.50	16.50	21.60	20.85
Norfolk	.20	8.20	......	......	8.90	8.65	9.20	8.90	10.70	......	......	......	......
Philadelphia	.10	9.60	10.10	10.76	11.35	9.70	9.95	9.75	12.05	17.48	16.48	21.58	20.83
Pittsburgh**	.15	9.37	10.81	11.68	11.64	9.21	9.72	9.37	11.40	17.10	16.10	21.20	20.45
Portland		10.40	12.25	12.35	12.40	10.55	11.00	10.40	16.65	18.60	17.85	22.70	22.15
San Francisco	.10	10.75	11.75[2]	11.95	12.80	10.90	11.20	10.65	15.20	18.30	17.35	22.90	22.20
Seattle		11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.20	18.60	17.85	22.70	22.15
Spokane	.15	11.35	12.45	13.40	12.80	10.95	11.50	10.80	16.35	17.75	17.95	21.58	22.30
St. Louis**	.15	9.57	10.73	10.66	11.74	9.43	9.95	9.59	11.43	17.48	16.48	21.58	20.83
St. Paul	.15	8.97	9.64	10.79	11.14	8.81	9.32	8.97	11.64	......	16.69	......	21.04

Base Quantities (Standard unless otherwise keyed): Cold finished bars: 2000 lb or over. Alloy bars: 1000 to 1999 lb. All others: 2000 to 4999 lb. All HR products may be combined for quantity. All galvanized sheets may be combined for quantity. CR sheets may be combined with each other for quantity. **These cities are on order quantity pricing. Prices shown are for 2000 lb item quantities of the following: Hot-rolled sheet—10 ga. x 36 x 96—120; Cold-rolled sheet—20 ga x 36 x 96—120; Galv. sheet—10 ga x 36—120; Hot-rolled strip—⅛" x 1"; Plate—¼" x 84"; Shapes—I-Beams 6 x 12.5; Hot-rolled bar—Rounds—¾-2 15/16; Cold-finished bar—C 1018—1" rounds; Alloy bar—hot-rolled 4615—1⅝" to 2⅞"; cold drawn—15/16" to 2⅞" round; Hot-rolled 4140—⅝" to 2⅞" round, cold drawn—15/16" to 2⅞" round.

†† 13¢ zinc. ‡ Deduct for country delivery. [1] 15 ga. & heavier; [2] 14 ga. & lighter. [3] 10 ga. x 48 — 120.

(Effective Sept. 18, 1961)

PIG IRON

Dollars per gross ton, f.o.b., subject to switching charges.

Producing Point	Basic	Fdry.	Mall.	Bess.	Low Phos.
Birdsboro, Pa. *B6*	68.00	68.50	69.00	69.50	73.00
Birmingham *R3*	62.00	62.50*	66.50	....	....
Birmingham *W9*	62.00	62.50*	66.50	....	....
Birmingham *U4*	62.00	62.50*	66.50	....	....
Buffalo *R3*	66.00	66.50	67.00	67.50	....
Buffalo *H1*	66.00	66.50	67.00	67.50	71.50†
Buffalo *W6*	66.00	66.50	67.00	67.50	....
Chester *P2*	68.00	68.50	69.00	....	....
Chicago *I4*	66.00	66.50	66.50	67.00	71.00†
Cleveland *A5*	66.00	66.50	66.50	67.00	71.00†
Cleveland *R3*	66.00	66.50	66.50	67.00	....
Duluth *I4*	66.00	66.50	66.50	67.00	71.00†
Erie *I4*	66.00	66.50	66.50	67.00	71.00†
Fontana *K1*	75.00	75.50	....	....	....
Geneva, Utah *C7*	66.00	66.50	....	....	....
Granite City *G2*	67.90	68.40	68.90	....	....
Hubbard *Y1*	....	....	66.50	....	....
Ironton, Utah *C7*	66.00	66.50	....	....	....
Lyles, Tenn. *T3*	....	....	....	....	73.00
Midland *C11*	66.00	....	....	....	....
Minnequa *C6*	68.00	68.50	69.00	....	....
Monessen *P6*	66.00	....	....	....	....
Neville Is. *P4*	66.00	66.50	66.50	67.00	71.00†
N. Tonawanda *T1*	....	66.50	67.00	67.50	....
Rockwood *T3*	62.00	62.50	66.50	67.00	73.00
Sharpsville *S3*	66.00	....	66.50	67.00	....
So. Chicago *R3*	66.00	66.50	66.50	67.00	....
So. Chicago *W8*	66.00	....	66.50	67.00	....
Swedeland *A2*	68.00	68.50	69.00	69.50	71.00†
Toledo *I4*	66-00	66.50	66.50	67.00	....
Troy, N. Y. *R3*	68.00	68.50	69.00	69.50	73.00
Youngstown *Y1*	....	....	66.50	....	....

DIFFERENTIALS: Add, 75¢ per ton for each 0.25 pct silicon or portion thereof over base (1.75 to 2.25 pct except low phos., 1.75 to 2.00 pct) 50¢ per ton for each 0.25 pct manganese or portion thereof over 1 pct, $2 per ton for 0.50 to 0.75 pct nickel, $1 for each additional 0.25 pct nickel.

Add $1.00 for 0.31-0.69 pct phos. Add 50¢ per gross ton for truck loading charge.

Silvery Iron: Buffalo (6 pct), *H1*, $79.25; Jackson *J1*, *I4*, Toledo, *I4*, $78.00; Niagara Falls (15.01-15.50), $101.00; Keokuk (14.01-14.50), $89.00; (15.51-16.00), $92.00. Add 75¢ per ton for each 0.50 pct silicon over base (6.01 to 6.50 pct) up to 13 pct; 13 to 13.5 pct; 13.5 to 14 pct, add $1. Add $1.00 for each 0.50 pct manganese over 1.00 pct.

† Intermediate low phos.

FASTENERS

(Base discounts, f.o.b. mill, based on latest list prices)

Hex Screws and All Bolts Including Hex & Hex, Square Machine, Carriage, Lag, Plow, Step, and Elevator

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Nuts: Hexagon and Square, Hex, Heavy Hex, Thick Hex & Square

(Discount for 1 container)	*Pct*
Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

Hexagon Head Cap Screws—UNC or UNF Thread—Bright & High Carbon

(Discount for 1 container)

Plain finish—packaged and bulk.	43
Hot galvanized and zinc plated—packaged	39.25
Hot galvanized and zinc plated—bulk	43

(Minimum plating charge — $10.00 per item. Price on application assembled to bolts.)

Machine Screws and Stove Bolts

(Packages—plain finish)

	Discount Screws	Discount Bolts
Full Cartons	46	46

Machine Screws—bulk

¼ in. diam or smaller	25,000 pcs	50
5/16, ⅜ & ½ in. diam	15,000 pcs	50

STAINLESS STEEL

Base price cents per lb. f.o.b. mill

Product	201	202	301	302	303	304	316	321	347	403	410	416	430
Ingots, reroll.	22.75	24.75	24.00	26.25	—	28.00	41.25	33.50	38.50	—	17.50	—	17.75
Slabs, billets	25.00	28.25	26.00	29.50	32.00	29.50	47.50	38.00	46.50	—	19.25-21.50	—	19.75-21.75
Billets, forging	—	37.75	38.75	39.50	42.50	39.50	64.50	48.75	57.75	26.75	29.25-26.75	29.75	29.75
Bars, struct.	43.50	44.50	46.00	46.75	49.75	46.75	75.75	57.50	67.25	31.50	35.00-31.50	35.50	35.50
Plates	39.25	40.00	41.25	42.25	45.00	42.25	71.75	54.75	64.75	30.00	30.00	31.25 31.75	31.00
Sheets	48.50	49.25	51.25	52.00	56.75	52.00	80.75	65.50	79.25	40.25	40.25	48.25	40.75
Strip, hot-rolled	36.00	39.00	37.25	40.50	—	40.50	68.50	53.50	63.50	—	31.00	—	32.00
Strip, cold-rolled	43.50	46.75	45.00	49.50	56.75	49.50	76.75	62.25	75.25	40.25	40.25	42.50	38.75
Wire CF; Rod HR	—	42.25	43.50	44.25	47.25	44.25	71.75	54.50	63.75	29.75	33.25-29.75	33.75	33.75

STAINLESS STEEL PRODUCING POINTS:

Sheets: Midland, Pa., *C11;* Brackenridge, Pa., *A3;* Butler, Pa., *A7;* Vandergrift, Pa., *U1;* Washington, Pa., *W2, J2;* Baltimore, *E1;* Middletown, O., *A7;* Massillon, O., *R3;* Gary, *U1;* Bridgeville, Pa., *U2;* New Castle, Ind., *I2;* Detroit, *M2;* Louisville, O., *R5.*

Strip: Midland, Pa., *C11;* Waukegan, Cleveland, *A5;* Carnegie, Pa., *S9;* McKeesport, Pa., *F1;* Reading, Pa., *C2;* Washington, Pa., *W2;* W. Leechburg, Pa., *A3;* Bridgeville Pa., *U2;* Detroit, *M2;* Detroit, *S1;* Canton, Massillon, O., *R3;* Harrison, N. J., *D3;* Youngstown. *R5;* Sharon, Pa., *S1;* Butler, Pa., *A7,* Wallingford. Conn., *U3* (plus further conversion extras); *W1* (25¢ per lb. higher); Seymour, Conn., *S13,* (25¢ per lb. higher); New Bedford, Mass., *R6;* Gary, *U1,* (25¢ per lb. higher); Baltimore, Md., *E1* (300 series only).

Bar: Baltimore, *A7;* S. Duquesne, Pa., *U1;* Munhall, Pa., *U1;* Reading, Pa., *C2;* Titusville, Pa., *U2;* Washington, Pa., *J2;* McKeesport, Pa., *U1, F1;* Bridgeville, Pa., *U2;* Dunkirk, N. Y., *A3;* Massillon, O., *R5;* S. Chicago, *U1;* Syracuse, N. Y., *C11;* Watervliet, N. Y., *A3;* Waukegan, *A5;* Canton, O., *T5, R3;* Ft. Wayne, *I4;* Detroit, *R5;* Gary, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Ambridge, Pa., *B7.*

Wire: Waukegan, *A5;* Massillon, O., *R3;* McKeesport, Pa., *F1;* Ft. Wayne, *J4;* Newark, N. J. *D2;* Harrison, N. J., *D3;* Baltimore, *A7;* Dunkirk, *A3;* Monessen, *P1;* Syracuse, *C11;* Bridgeville, *U2;* Detroit, *R5;* Reading, Pa., *C2;* Bridgeport, Conn., *N8* (down to and including ¼").

Structurals: Baltimore, *A7;* Massillon, O., *R3;* Chicago, Ill., *J4;* Watervliet, N. Y., *A3;* Syracuse, *C11;* S. Chicago, *U1.*

Plates: Ambridge, Pa., *B7;* Baltimore, *E1;* Brackenridge, Pa., *A3;* Chicago, *U1;* Munhall, Pa., *U1;* Midland, Pa., *C11;* New Castle, Ind., *I2;* Middletown, *A7;* Washington, Pa., *J2;* Cleveland, Massillon, *R3;* Coatesville, Pa., *C15;* Vandergrift, Pa., *U1;* Gary, *U1:* Claymont, Del; *P2.*

Forging billets: Ambridge Pa., *B7;* Midland, Pa., *C11;* Baltimore, *A7;* Washington, Pa., *J2;* McKeesport, *F1;* Massillon, Canton, O., *R3;* Watervliet. *A3;* Pittsburgh, Chicago, *U1;* Syracuse, *C11;* Detroit, *R5;* Munhall, Pa., S. Chicago, *U1;* Owensboro, Ky., *G5;* Bridgeport, Conn., *N8;* Reading, Pa., *C2.*

Machine Screw and Stove Bolt Nuts

(Packages—plain finish)

		Discount Hex	Discount Square
Full Cartons		46	57
Bulk			
¼ in. diam or smaller	25,000 pcs	56	60
5/16 or ⅜ in. diam	15,000 pcs	56	60

Rivets

	Base per 100 lb
½ in. diam and larger	$12.85
	Pct Off List
7/16 in. and smaller	15

NOTE: Ferroalloy prices are published in alternate issues.

TOOL STEEL

F.o.b. mill

W	Cr	V	Mo	Co	per lb	AISI
18	4	1	—	—	$1.84	T-1
18	4	1	—	5	2.545	T-4
18	4	2	—	—	2.005	T-2
1.5	4	1.5	8	—	1.20	M-1
6	4	3	6	—	1.59	M-3
6	4	2	5	—	1.345	M-2
High-carbon chromium					.955	D-3, D-5
Oil hardened manganese					.505	O-2
Special carbon					.38	W-1
Extra carbon					.38	W-1
Regular carbon					.325	W-1

Warehouse prices on and east of Mississippi are 4¢ per lb higher. West of Mississippi, 6¢ higher.

LAKE SUPERIOR ORES

51.50% Fe natural, delivered lower Lake ports. Interim prices for 1960 season. Freight changes for seller's account.

	Gross Ton
Openhearth lump	$12.70
Old range, bessemer	11.85
Old range, nonbessemer	11.70
Mesabi, bessemer	11.60
Mesabi, nonbessemer	11.45
High phosphorus	11.45

(Effective Sept. 18, 1961)

MERCHANT WIRE PRODUCTS

F.o.b. Mill	Standard & Coated Nails	Woven Wire Fence	"T" Fence Posts	Single Loop Bale Ties	Galv. Barbed and Twisted Barbless Wire	Merch. Wire Ann'ld	Merch. Wire Galv.
	Col	Col	Col	Col	Col	¢/lb.	¢/lb.
Alabama City *R3*	173	187	...	212	193	9.00	9.55
Aliquippa *J3****	173	190	...	...	190	9.00	9.675
Atlanta *A8***	173	191	...	212	197	9.00	9.75
Bartonville *K2***	175	193	183	214	199	9.10	9.85
Buffalo *W6*	...	...	...	...	...	9.00	9.55*
Chicago *N4*	173	191	177	212	197	9.00	9.75
Chicago *R3*	...	...	...	...	...	9.00	9.55
Chicago *W7*	173	...	...	...	...	9.00	9.55†
Cleveland *A6*	...	...	...	...	...	...	...
Cleveland *A5*	...	...	...	...	...	9.00	...
Crawf'dsv. *M4***	175	192	...	214	198	9.10	9.80
Donora Pa. *A5*	173	187	...	212	193	9.00	9.55
Duluth *A5*	173	187	177	212	193	9.00	9.55
Fairfield, Ala. *T2*	173	187	...	212	193	9.00	9.55
Galveston *D4*	9.10‡	...	...	...	...	...	...
Houston *S2**	178	192	...	217	198	9.25	9.80†
Jacksonville *M4*	175	192	...	214	198	9.10	9.80††
Johnstown *B3***	173	190	177	...	196	9.00	9.675
Joliet Ill. *A5*	173	187	...	212	193	9.00	9.55
Kokomo *C9**	175	189	...	214	195*	9.10	9.65*
L. Angeles *B2****	...	...	...	...	...	9.95	10.625
Kansas City *S2**	178	192	...	217	198*	9.25	9.80†
Minnequa *C6*	178	192	182	217	198†	9.25	9.80†
Palmer, Mass *W6*	...	...	...	...	...	9.30	9.85*
Pittsburg, Cal. *C7*	192	210	...	...	213	9.95	10.50
Rankin Pa. *A5*	173	187	...	...	193	9.00	9.55
So. Chicago *R3*	173	187	...	...	193	8.65	9.20
S. San Fran. *C6*	...	...	...	236	...	9.95	10.50
SparrowsPt. *B3***	175	...	...	215	198	9.10	9.775
Struthers, O. *Y1**	...	...	...	...	...	8.65	9.20
Worcester *A5*	179	...	...	...	...	9.30	9.85
Williamsport *S5*	...	...	...	...	...	...	...

* Zinc less than .10¢. *** .10¢ zinc.
** 13-13.5¢ zinc. † Plus zinc extras.
‡ Wholesalers only. †† 0.115¢ zinc.

PIPE AND TUBING

Base discounts (pct) f.o.b. mills. Base price about $200 per net ton.

	BUTTWELD														SEAMLESS							
	½ In.		¾ In.		1 In.		1¼ In.		1½ In.		2 In.		2½–3 In.		2 In.		2½ In.		3 In.		3½–4 In.	
STANDARD T. & C.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.	Blk.	Gal.
Sparrows Pt. *B3*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*10.75	*26.00	*7.75	*22.00	*4.25	*17.50	*1.75	*16.75	*1.25	*15.75	*0.75	*15.25	0.75	*15.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Alton, Ill. *L1*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	0.25	*15.0	3.25	*11.0	6.75	*6.50	9.25	*5.75	9.75	*4.75	10.25	*4.25	11.75	*4.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*7.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Wheeling *W5*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
Indiana Harbor *Y1*	1.25	*14.0	4.25	*10.0	7.75	*5.50	10.25	*4.75	10.75	*3.75	11.25	*3.25	12.75	*3.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	2.25	*13.0	5.25	*9.0	8.75	*4.50	11.25	*3.75	11.75	*2.75	12.25	*2.25	13.75	*2.50	*12.25	*27.25	*5.75	*22.50	*3.25	*20.0	*1.75	*18.50
EXTRA STRONG PLAIN ENDS																						
Sparrows Pt. *B3*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *R3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Fairless *N2*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Fontana *K1*	*6.25	.....	*2.25	.....	0.75	.....	1.25	.....	1.75	.....	2.25	.....	2.75	.....	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *J3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Alton, Ill. *L1*	4.75	*9.0	8.75	*5.0	11.75	*0.50	12.25	*1.75	12.75	*0.75	13.25	*0.25	13.75	*1.50	.....	.....	.....	.....	.....	.....	.....	.....
Sharon *M3*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Pittsburgh *N1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Wheeling *W5*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Wheatland *W4*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	.....	.....	.....	.....	.....	.....	.....	.....
Youngstown *Y1*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50
Indiana Harbor *Y1*	5.75	*8.0	9.75	*4.0	12.75	0.50	13.25	*0.75	13.75	0.25	14.25	0.75	14.75	*0.50	.....	.....	.....	.....	.....	.....	.....	.....
Lorain *N2*	6.75	*7.0	10.75	*3.0	13.75	1.50	14.25	0.25	14.75	1.25	15.25	1.75	15.75	0.50	*10.75	*24.75	*3.25	*19.0	*0.75	*16.50	4.25	*11.50

Threads only, buttweld and seamless, 2¼ pt. higher discount. Plain ends, buttweld and seamless, 3-in. and under, 5½ pt. higher discount.

Galvanized discounts based on zinc price range of over 9¢ to 11¢ per lb. East St. Louis. For each 2¢ change in zinc, discounts vary as follows: ½, ¾ and 1-in., 2 pt.; 1¼, 1½ and 2-in., 1½ pt.; 2½ and 3-in., 1 pt., e.g., zinc price range of over 13¢ to 15¢ would lower discounts on 2½ and 3-in. pipe by 2 points; zinc price in range over 7¢ to 9¢ would increase discounts. East St. Louis zinc price now 11.50¢ per lb.

CAST IRON WATER PIPE INDEX

Birmingham	125.8
New York	138.6
Chicago	140.0
San Francisco-L. A.	148.6

Dec. 1955, value, Class B or heavier 5 in. or larger, bell and spigot pipe. Explanation: p. 57, Sept. 1, 1955, issue. Source: U. S. Pipe and Foundry Co.

COKE

	Net-Ton
Furnace, beehive (f.o.b.) Connellsville, Pa.	$14.75 to $15.50
Foundry, beehive (f.o.b.)	$18.50
Foundry oven coke	
Buffalo, del'd	$33.25
Chattanooga, Tenn.	30.80
Ironton, O., f.o.b.	30.50
Detroit, f.o.b.	32.00
New Haven, f.o.b.	31.00
Kearny, N. J., f.o.b.	31.25
Philadelphia, f.o.b.	31.00
Swedeland, Pa., f.o.b.	31.00
Painesville, Ohio, f.o.b.	32.00
Erie, Pa., f.o.b.	32.00
St. Paul, f.o.b.	31.25
St Louis, f.o.b.	33.00
Birmingham, f.o.b.	30.35
Milwaukee, f.o.b.	32.00
Neville Is., Pa.	30.75

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In the best circles you'll find they use only . . .
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CAP SCREWS · SET SCREWS · MILLED STUDS
CUSTOM SCREW MACHINE SPECIALTIES
*Wm. H. Ottemiller Co.
YORK, PENNSYLVANIA

KARDONG FOUR-WAY BENDER
For Concrete Reinforcing Steel
Model D-2

The Model D-2 Kardong Bender is a Four Direction Horizontal Bender. With this bender it is not necessary to turn bars over to make reverse or second bends on beam bars. The Model D-2 is made in two sizes. Model D-2 Standard 6-inch, which will bend bars around collars 2-inch to 6-inch and Model D-2 Special 8-inch, which will bend bars around collars 2-inch to 8-inch. Capacity of both models, 1¼-inch Square Bars. The Model D-2 is a production bender for reinforcing steel fabricating shop. Ask for catalog of our complete line of reinforcing bar-benders.

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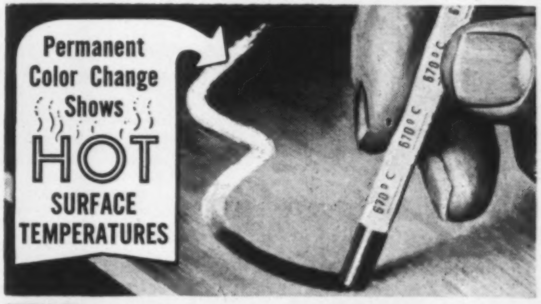
MINNEAPOLIS 13, MINN.



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Temperature Indicating Crayons

Easy to carry and use. Thermochrom crayons are indispensable when quick checks of hot surface temperatures are desired. A clearly visible, distinct change of color indicates temperature reached. All color changes are permanent and much easier to recognize than melting type indicators. Heat indication accuracy is unaffected by high voltage, magnetic fields, ionized gases and static electricity. Eighteen crayons cover temperatures ranging from 150° to 1240°F. Crayons $2.00 each. Full assortment $36.00.

*T.M.
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Princeton Division Princeton, New Jersey
Also available through AIRCO Distributors

RAILS, TRACK SUPPLIES

F.o.b. Mill Cents Per Lb	No. 1 Std. Rails	Light Rails	Joint Bars	Track Spikes	Tie Plates	Track Bolts Untreated
Bessemer *U1*	5.75	6.725	7.25	.....	.....	.....
Cleveland *R3*	.....	.....	.....	.....	.....	15.35
So. Chicago *R3*	.....	.....	.....	10.10	.....	.....
Ensley *T2*	5.75	6.725	.....	.....	.....	.....
Fairfield *T2*	.....	6.725	.....	10.10	6.875	.....
Gary *U1*	5.75	.....	.....	.....	6.875	.....
Huntington, *C16*	.....	6.725	.....	.....	.....	.....
Ind. Harbor *I3*	.....	.....	.....	10.10	.....	.....
Johnstown *B3*	.....	6.725	.....	.....	.....	.....
Joliet *U1*	.....	.....	7.25	.....	.....	.....
Kansas City *S2*	.....	.....	.....	10.10	.....	15.35
Lackawanna *B3*	5.75	6.725	7.25	.....	6.875	.....
Lebanon *B3*	.....	.....	7.25	.....	.....	15.35
Minnequa *C6*	5.75	7.225	7.25	10.10	6.875	15.35
Pittsburgh *S14*	.....	.....	.....	.....	.....	15.35
Pittsburgh *J3*	.....	.....	.....	10.10	.....	.....
Seattle *B2*	.....	.....	.....	.....	7.025	15.85
Steelton *B3*	5.75	.....	7.25	.....	6.875	.....
Struthers *Y1*	.....	.....	.....	10.10	.....	.....
Torrance *C7*	.....	.....	.....	.....	6.75	.....
Williamsport *S5*	.....	6.725	.....	.....	.....	.....
Youngstown *R3*	.....	.....	.....	10.10	.....	.....

C-R SPRING STEEL

Cents Per Lb F.o.b. Mill	CARBON CONTENT				
	0.26–0.40	0.41–0.60	0.61–0.80	0.81–1.05	1.06–1.35
Anderson, Ind. *G4*	9.10	.....	.....	.....	.....
Baltimore, Md. *T8*	9.50	10.70	12.90	15.90	18.85
Bristol, Conn. *W12*	.....	10.70	12.90	16.10	19.30
Boston *T8*	9.50	10.70	12.90	15.90	18.85
Buffalo, N. Y. *R7*	8.95	10.40	12.60	15.60	18.55
Carnegie, Pa. *S9*	8.95	10.40	12.60	15.60	18.55
Cleveland *A5*	8.95	10.40	12.60	15.60	18.55
Dearborn *S1*	9.05	10.50	12.70	.....	.....
Detroit *D1*	9.05	10.50	12.70	15.70	.....
Detroit *D2*	9.05	10.50	12.70	.....	.....
Dover, O. *G4*	8.95	10.40	12.60	15.60	18.55
Evanston, Ill. *M8*	9.05	10.40	12.60	15.60	.....
Franklin Park, Ill. *T8*	9.05	10.40	12.60	15.60	18.55
Harrison, N. J. *C11*	.....	.....	12.90	16.10	19.30
Indianapolis *R5*	9.10	10.55	12.60	15.60	18.55
Los Angeles *C1*	11.15	12.60	14.80	17.80	.....
New Britain, Conn. *S7*	9.40	10.70	12.90	15.90	18.85
New Castle, Pa. *B4*	8.95	10.40	12.60	15.60	.....
New Castle, Pa. *M10*	8.95	10.40	12.60	15.60	.....
New Haven, Conn. *D1*	9.40	10.70	12.90	15.90	.....
Pawtucket, R. I. *N7*	9.50	10.70	12.90	15.90	18.85
Riverdale, Ill. *A1*	9.05	10.40	12.60	15.60	18.55
Sharon Pa. *S1*	8.95	10.40	12.60	15.60	18.55
Trenton, *R4*	.....	10.70	12.90	16.10	19.30
Warren, Ohio *T4*	8.95	10.40	12.60	15.60	18.75
Worcester, Mass. *A5*	9.50	10.70	12.90	15.90	18.85
Youngstown *R5*	9.10	10.55	12.60	15.60	18.55

ELECTROPLATING SUPPLIES

Anodes

(Cents per lb, frt allowed in quantity)

Copper	
Rolled elliptical, 18 in. or longer, 5000 lb lots	44.50
Electrodeposited, 5000 lb lots	37.50
OFHC anodes, 3 in. diam. (5000 lb)	42.50
Brass, 80-20, ball anodes, 2000 lb or more	51.50
Zinc, ball anodes, 2000 lb lots	18.25
(for elliptical add 1¢ per lb)	
Nickel, 99 pct plus, rolled carbon, 5000 lb	1.05
(Rolled depolarized add 3¢ per lb)	
Cadmium, 5000 lb	1.60

Tin, ball anodes $1.26 per lb (approx.).

Chemicals

(Cents per lb, f.o.b. shipping point)

Copper cyanide, 100 lb drum, N. Y.	65.90
Copper sulphate, 25.2 Cu min, 6000 lbs per cwt, Detroit	17.45
Nickel sulfate, 5000 lbs	31.00
Nickel chloride, freight allowed, 100 lb	47.50
Sodium cyanide, domestic, del'd east of Rockies, 200 lb drums	25.80
Zinc cyanide, 100 lb, N. Y.	61.50
Potassium cyanide, 100 lb drum Chicago, del'd east of Rockies	46.50
Chromic acid, flake type, 10,000 lb or more, N. Y.	30.94

METAL POWDERS

(Cents per lb, f.o.b. shipping point for ton lots or over, except as noted)

Iron Powders		
Molding grade, domestic and foreign, 98 pct Fe, 100 mesh bags, freight allowed east of Miss. R.		11.50
Electrolytic Iron, melting stock, 99.87 pct Fe, truckload lots		25.75
Carbonyl Iron (200 lb lots)		88.00
Welding Grades		8.10
Cutting and Scarfing Grades		9.85
Hydrogen reduced, domestic		11.25
Copper Powders		
Molding Grades		
Electrolytic, domestic, f.o.b. shipping point.		15.00†
Atomized	44.3 to	62.3
Reduced		15.00†
Chemically Precipitated		45.5
Brass, 5000-lb lots	33.1 to	50.3
Bronze, 5000-lb lots	51.5 to	56.8
Chromium, electrolytic		5.00
Lead		7.50†
Manganese, electrolytic		$1.00
Molybdenum	$3.60 to	$4.35
Nickel		$1.15
Carbonyl Nickel, 20,000 lb lots		$1.01
Nickel-Silver, 5000 lb lots	56.0 to	68.0
Silicon		70.00
Solder		7.00†
Stainless Steel, 316		$1.07
Stainless steel 304		89.00
Tin		15.00†
Titanium, 99.25 + pct, per lb, f.o.b.		$11.25
Tungsten, carbide grades		$3.25
Zinc	19.5 to	32.7

† Plus cost of metal.

ELECTRICAL SHEETS

22-Gage F.o.b. Mill Cents Per Lb	Hot-Rolled (Cut Lengths)*	Cold-Reduced (Coiled or Cut Length)	
		Semi-Processed	Fully Processed
Field	.....	9.875	.....
Armature	11.70	11.20	11.70
Elect.	12.40	11.90	12.40
Special Motor	.....	12.475	.....
Motor	13.55	13.05	13.55
Dynamo	14.65	14.15	14.65
Trans. 72	15.70	15.20	15.70
Trans. 65	16.30	Grain Oriented	
Trans. 58	16.80	Trans. 80	19.70
Trans. 52	17.85	Trans. 73	20.20
		Trans. 66	20.70

Producing points: Aliquippa (*J3*); Beech Bottom (*W5*); Brackenridge (*A3*); Granite City (*G2*)· Indiana Harbor (*I3*); Mansfield (*E2*); Newport, Ky. (*A9*); Niles, O. (*S1*); Vandergrift (*U1*); Warren, O. (*R3*); Zanesville, Butler (*A7*).

CLAD STEEL

Base prices, cents per lb f.o.b.

	Cladding	Plate (*L4, P2, A3, J2*)			Sheet (*I2*)
		10 pct	15 pct	20 pct	20 pct
Stainless Type	302	.....	.....	.....	37.50
	304	28.80	31.55	34.30	39.75
	316	42.20	46.25	50.25	58.25
	321	34.50	37.75	41.05	47.25
	347	40.80	44.65	48.55	57.00
	405	24.60	26.90	29.25	.....
	410	22.70	24.85	27.00	.....
	430	23.45	25.65	27.90	.....

CR Strip (S9) Copper, 10 pct, 2 sides, $43.85; 1 side, $36.60.

(Effective Sept. 18, 1961)

REFRACTORIES

Fire Clay Brick

	Carloads per 1000
Super duty, Mo., Pa., Md., Ky.	$185.00
High duty (except Salina, Pa., add $5.00)	133.00
Medium duty	125.00
Low duty (except Salina, Pa., add $2.00)	103.00
Ground fire clay, net ton, bulk	22.50

Silica Brick

Mt. Union, Pa., Ensley, Ala.	$158.00
Childs, Hays	163.00
Chicago District	168.00
Western Utah	183.00
California	185.00
Super Duty	
Hays, Pa., Athens, Tex., Windham, Warren, O.	163.00-168.00
Silica cement, net ton, bulk, Chicago	26.75
Silica cement, net ton, bulk, Ensley, Ala.	27.75
Silica cement, net ton, bulk, Mt. Union, Pa.	25.75
Silica cement, net ton, bulk, Utah and Calif.	39.00

Chrome Brick

Standard chemically bonded,	
Baltimore, Md.	$620.00
Gary, Ind.	658.50
Standard, Pascagoula, Miss.	647.50
Standard chemically bonded, Curtiner, Calif.	119.00
Burned, Baltimore	585.00

Magnesite Brick

Standard, Baltimore	$715.00
Chemically bonded, Baltimore	655.00
Chemically bonded, Pascagoula, Miss.	682.50

Grain Magnesite

St. ⅜ to ½-in. grains

	Per net ton
Domestic, f.o.b. Baltimore in bulk.	$73.00
Domestic, f.o.b., Pascagoula, Miss.	80.00
Domestic, f.o.b. Chewalah, Wash., Luning, Nev.	
in bulk	46.00
in sacks	52.00-54.00

Dead Burned Dolomite

F.o.b. bulk, producing points in:	
Pa., W. Va., Ohio	$16.75
Missouri Valley	15.60
Midwest	17.00

ELECTRODES

Cents per lb. f.o.b. plant, threaded, with nipples, unboxed.

GRAPHITE			CARBON*		
Diam. (In.)	Length (In.)	Price	Diam. (In.)	Length (In.)	Price
24	84	27.25	40	100, 110	12.50
20	72	26.50	35	110	11.20
18	72	27.50	30	110	11.70
14	72	27.25	24	72	11.95
12	72	28.25	20	90	11.55
10	60	29.50	17	72	12.10
10	48	30.00	14	72	12.55
7	60	29.75	10	60	13.80
6	60	33.25	8	60	14.25
4	40	37.00			
3	40	39.25			
2½	30	41.50			
2	24	64.00			

* Prices shown cover carbon nipples.

BOILER TUBES

$ per 100 ft. carload lots cut 10 to 24 ft. F.o.b. Mill	Size		Seamless		Elec. Weld
	OD-In.	B.W. Ga.	H.R.	C.D.	H.R.
Babcock & Wilcox Jones & Laughlin * Ohio Seamless Tube Div., Copperweld Steel Co.*	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
National Tube	2	13	40.28	47.21	35.74
	2½	12	54.23	63.57	48.13
	3	12	62.62	73.40	55.59
	3½	11	73.11	85.70	65.84
	4	10	97.08	113.80	88.10
Pittsburgh Steel	2	13	40.28	47.21	.....
	2½	12	54.23	63.57	.....
	3	12	62.62	73.40	.....
	3½	11	73.11	85.70	.....
	4	10	97.08	113.80	.....

* Electricweld only.

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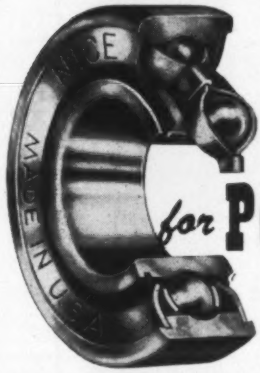

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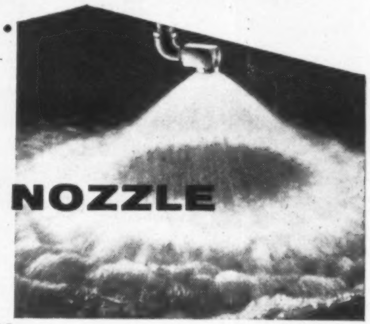

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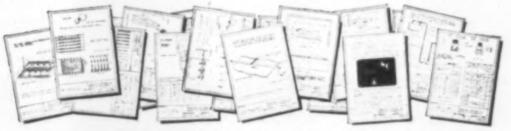

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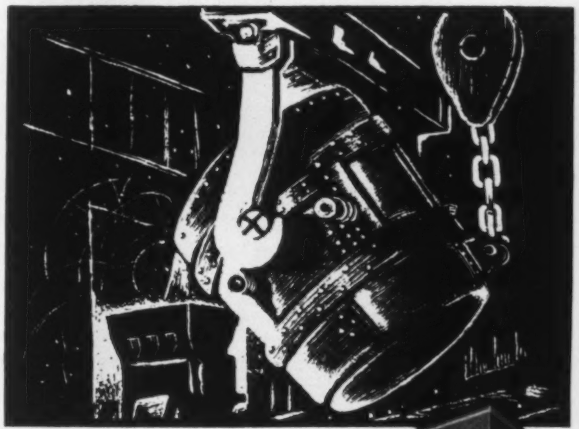

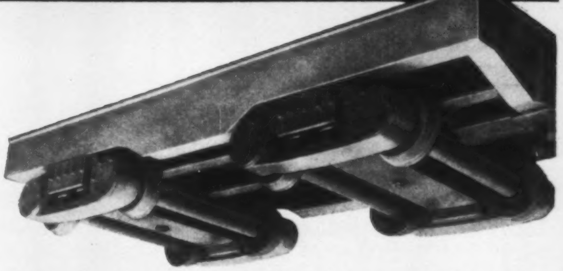

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No. 59 Toledo SSSC Tie Rod Press; Cap. 345-tons; 10″ stroke

15 Solid Back Presses from 40 to 100-tons, Ferracute, Danly, Toledo, etc.

No. R-41-P Wiedemann Turret Type Punch Press

No. 174 Toledo Toggle Drawing & Deep Stamping Press Cap. 126-tons

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2—17" DIA PULLBACKS
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20—8" Dia. x 4"/6"/8" Face 2-Hi Cold Mills with 25 H.P. Motors 230 v. DC. Edge Rollers, Coilers, etc.—complete.

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New York Dealers Are Optimistic

Used machinery dealers in New York can't point to anything substantial to show sales gains. But they are more optimistic.

They say there are enough government contracts around to mean added business.

- Used machinery dealers around the New York area are a little disappointed, but not pessimistic.

Reason: Business isn't particularly good. But there are some signs it might be getting better.

There are two barometers used equipment dealers watch. And right now both indicate rising sales ahead.

One is rate of inquiries. This has picked up in recent weeks. Dealers say the number of people asking about equipment is usually an indication, and directly proportionate, to upcoming business.

But they caution that business during the summer was bad. And if inquiries hadn't started picking up they would be considerably concerned.

Contract Bidding—The other indicator is the number of government contracts up for bidding, particularly those on which smaller and medium sized companies can compete. They say there are quite a few around now. In many cases the bidders are trying to line up the equipment they would need to fulfill the contract. If they win the bid, they buy.

But dealers point out that someone must win, and there are enough bidders who don't have the necessary equipment to indicate heavier sales before the year is out.

On the optimistic side, most dealers admit that while business isn't what they think it should be, it is about the same as last year. And they claim there is a better than even chance that a small flurry of business in the last quarter could push 1961 sales clearly over 1960.

No Shortage—Dealers report no shortage of any type of late-model used equipment. Among the best moving items right now is fabricating equipment. There is plenty of this around.

Because of this, buyers are shopping more than ever on price. This has pretty well localized most of the business.

And, although dealers don't like to talk about it, few sales are completed on the initial asking price. Used tool men in New York do say that prices may be as low as they are going to get if the current pickup of inquiries can be believed.

However, if the amount of defense related sales keeps increasing prices may firm up quickly.

Additional defense buys could bring price advances. The greater number of government contracts points this up.

Some dealers are starting to pay more attention to foreign markets—particularly Europe. Rate of inquiries is increasing although buying is slim.

A few dealers are becoming a little skeptical. They say inquiries have been good from Europe for much of this year. But the number of sales hasn't picked up.

Most of the inquiries from Europe are for heavier equipment, on which new items would take a year or more for delivery.

FOR SALE

1 ton x 11'8" Shaw-Box 1946 DC
3 ton x 19'9" Shepard-Niles 1943 DC
5 ton x 45'0" Shepard-Niles AC 1945
5 ton x 45'0" P&H DC 1941
7½ ton x 107'0" Whiting AC 1949
10 ton Cantilever crane 35'0" span 1943 AC
10 ton x 28'0" Shaw-Box 1941 DC
10 ton x 45'0" Bedford 1941 DC
10 ton x 75'0" Northern 1925 AC
20 ton x 28'10" Shaw-Box DC 1946 DC
25 ton x 99'0" Leonard Burke 1943 AC

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Industrial Engineering Service

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7/8" x 16' Cap. NEW 1958

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Mfd. by Babcock & Wilcox. ASME rated. Oper. Pressure 1750#. 3572# pressure tested. 650 deg. F., Max. temp.; Weight 80,500#. Blt. 1952. Size 23'Lx53" I.D. With piping valves, fittings, etc. 300 TON BALDWIN HORIZ. FORGING OR EXTRUSION PRESS—with above. Will sell separately.

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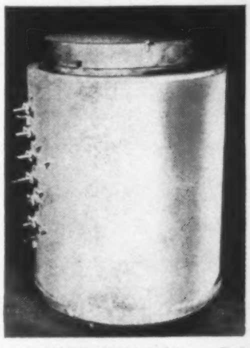

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BOX H-217
c/o IRON AGE, Chestnut at 56th, Phila. 39

Situations Wanted

MELT SHOP SUPERINTENDENT, Electric Furnace, 25 years experience, 13 years in small ingot shop. Best of references. Any area, available immediately. Box H-219, c/o IRON AGE, Chestnut at 56th, Phila. 39.

INDUSTRIAL SALESMAN, financially responsible, wants active participation and investment opportunity up to $50,000 in well established firm manufacturing metal components or raw material. Wharton graduate, 42 with 15 years' experience selling OEM and industrial consumers. Can relocate. References available. Box H-221, c/o IRON AGE, Chestnut at 56th, Phila. 39.

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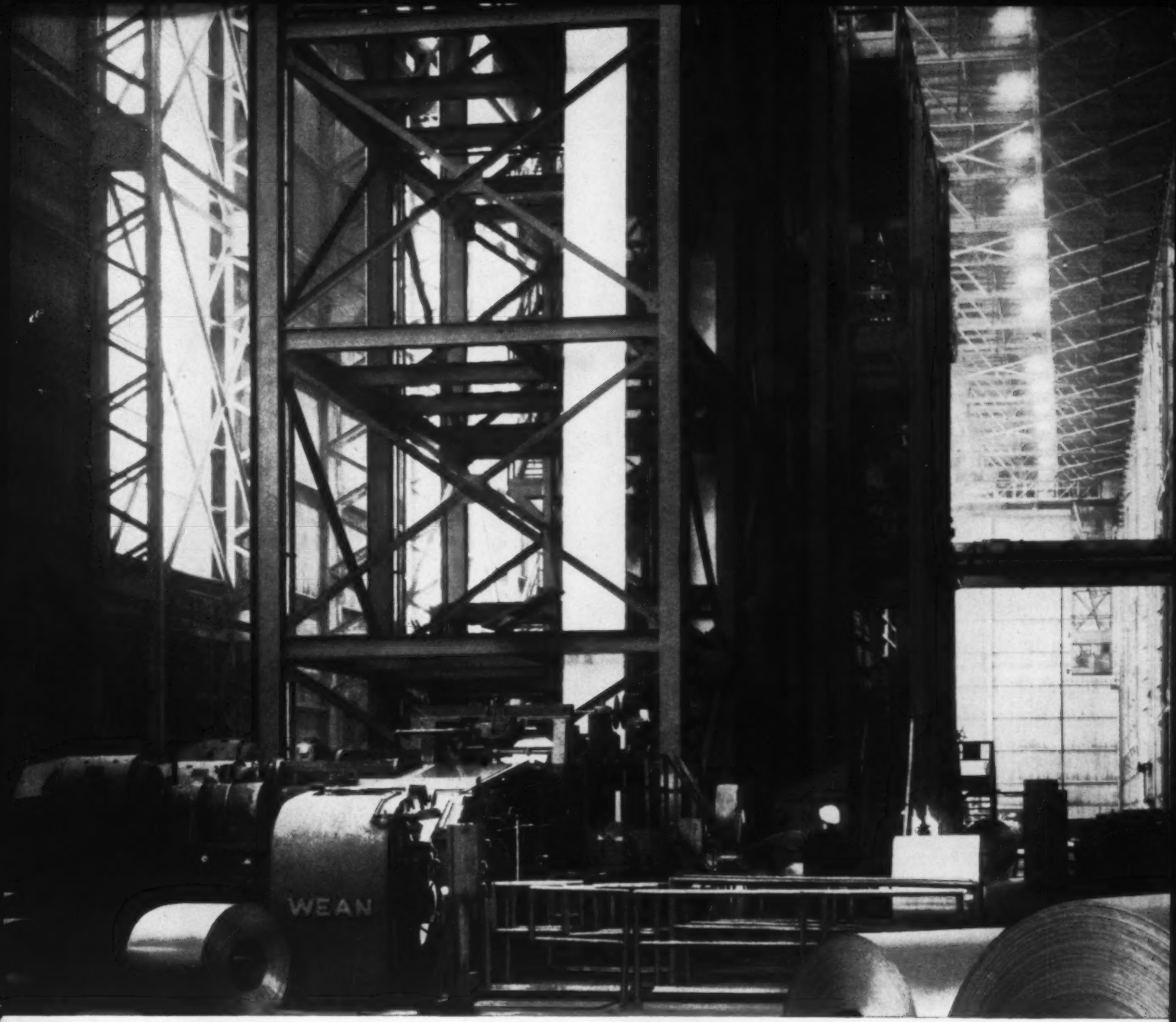

Kaiser Steel adds Wean Annealing Line in expansion of West Coast plant

This continuous tin plate annealing line marks the eighth Wean continuous processing facility installed at Kaiser Steel Corporation's Fontana, California plant, to service that company's customers for finished steels on the West Coast.

The Fontana line is capable of handling 30,000 lb. coils, with a maximum I.D. of 16½", and an O.D. of 66". Operating at speeds up to 1200 feet per minute, the new line can process strip from .006" to .015" thick, and from 18" to 38" wide.

Other Wean continuous processing equipment at Kaiser's Fontana plant includes a hot strip pickle line, two side trimming and recoiling lines, an electrolytic cleaning line, two electrolytic tinning lines, and a tin plate shearing line.

Wean's "creative engineering" can help you meet your customer requirements.

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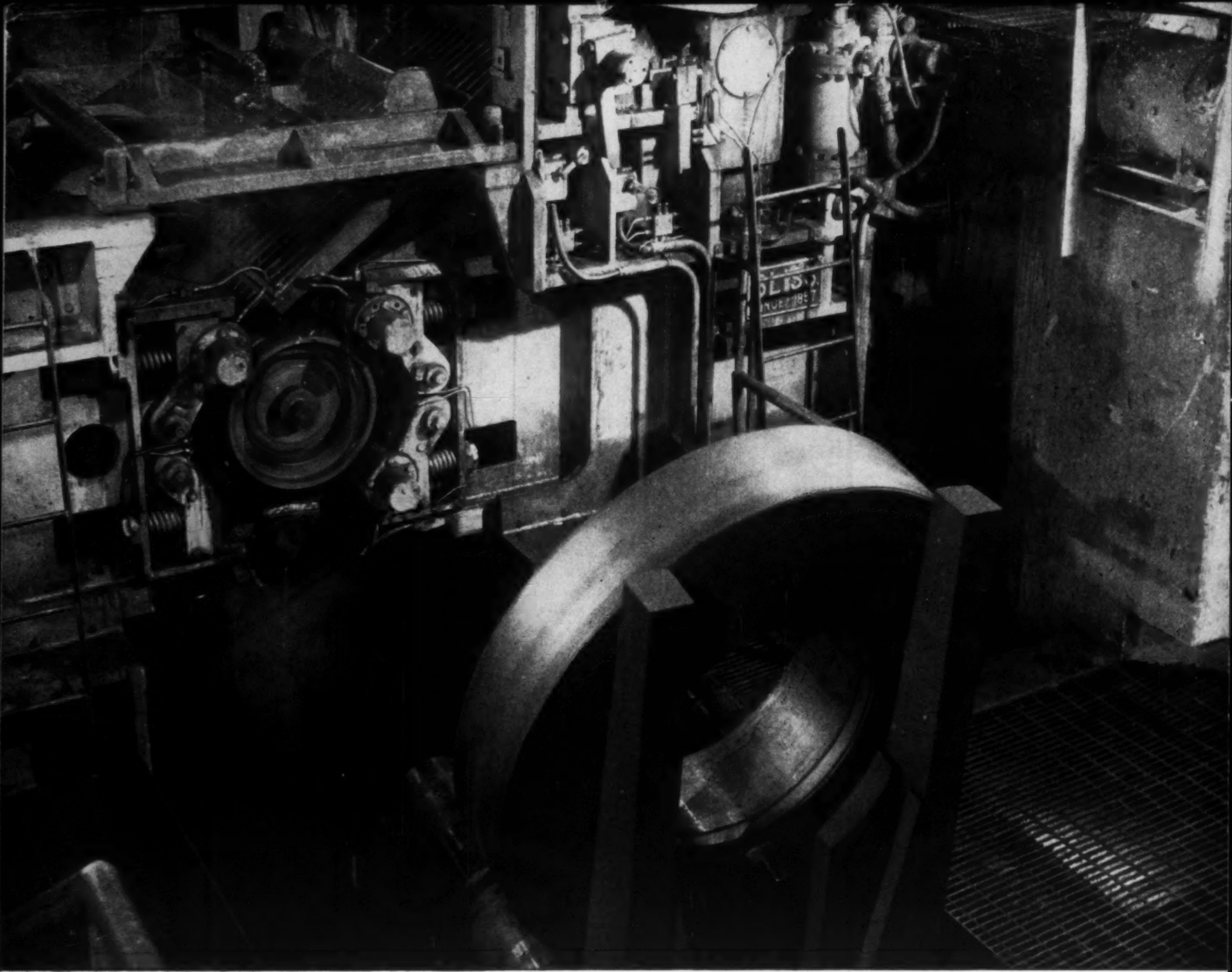

New downcoiler plays key role at Acme Steel's new hot strip mill

Among important Bliss mill auxiliaries selected by Acme Steel for the new hot strip mill at its Riverdale, Ill., plant, is the new downcoiler shown here. The coiler was designed with two objectives: simplicity and flexibility. Simplicity, by keeping the number of moving parts to a minimum for low maintenance costs and reduced downtime. Flexibility, by designing to permit the use of one, two, three or four blocker rolls without mechanical or electrical alterations.

Other units designed and built by Bliss' Rolling Mill Division include a combination depiler and furnace feeder, a furnace peeler, a crop shear and the side gauges at the end of the runout table just before the downcoiler.

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